

## B01F

**MIXING, e.g. DISSOLVING, EMULSIFYING, DISPERSING ([N: miscellaneous implements for preparing food, e.g. machines for domestic use for mixing, egg-whisks, cream beaters [A47J 43/00](#)]; mixing paints [B44D 3/06](#); [N: apparatus specially adapted for mixing radioactively contaminated material [G21F 9/008](#)])**

### Definition statement

*This subclass/group covers:*

Agitation and/or homogenization of products formed by a combination of two or more components with the purpose of obtaining an homogeneous composition or homogeneous conditions in the mass of material.

Stirring of a single material with the purpose of obtaining homogeneous conditions in the mass of material.

This subclass covers the mixing, agitation and homogenization of materials, irrespective of the application in which it is produced, whenever the device and/or method is directed to achieve said desired effect.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Disinfection, sterilisation or deodorisation of air	<a href="#">A61L 9/00</a>
Evaporation	<a href="#">B01D 1/00</a>
Distillation	<a href="#">B01D 3/00</a>
Reactors	<a href="#">B01J 19/00</a>
Granulation (with or without coating)	<a href="#">B01J 2/00</a>
Crushing, pulverising, disintegrating	B02
Flotation	<a href="#">B03D</a>
Spraying, atomising	<a href="#">B05B</a> , <a href="#">B05C</a>
Air-conditioning, air-humidification, ventilation	<a href="#">F24F</a>
Drying	F26

Heat-exchange apparatus in which the heat-exchange media are contacted, e.g. cooling towers	<a href="#">F28C</a>
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### Special rules of classification within this group

In general, devices and methods in which agitation and or contact of materials is produced, the object of said agitation/contact being different than for obtaining an homogeneous mixture (e.g. mass transfer devices and processes, a mere contact of two or more different materials, devices or processes in which agitation/homogenization is intrinsic to the process per se but it is not the primary purpose) are not classified in this subclass.

As a general rule, the following information is to be classified in its whole extent:

What is mixed, i.e. the phases of materials being mixed: groups [B01F 1/00](#) and [B01F 3/00](#).

How it is mixed: groups [B01F 5/00](#), [B01F 7/00](#), [B01F 9/00](#), [B01F 11/00](#) and [B01F 13/00](#).

Auxiliary information: groups [B01F 15/00](#).

The use of substances used as emulsifying, wetting, dispersing or foam-producing agents is normally only classified in [B01F 17/00](#), except when the related devices for mixing are also disclosed.

With regard to the phases to be mixed, the following is to be observed:

- when only a general reference to the phases is indicated, only the Indexing Codes [B01F 1/00](#) and [B01F 3/00](#) are used;
- if reference is made to the use of the device for any kind of mixtures, it is not classified in [B01F 1/00](#), [B01F 3/00](#), [B01F 1/00](#) or [B01F 3/00](#);
- when the application is of relevance (i.e. the type of product produced is claimed or the device is claimed for making a specific product) then it is also classified in the corresponding application field;
- if the possible application or applications are only mentioned in a generic way (i.e. as possible uses of the device) then the corresponding KW is used instead.

With regard to the way of mixing all parts of the device which are used for mixing are classified in its corresponding group. When more than one mixing device form part of the apparatus, the device is also classified in [B01F 13/10](#).

With regard to the auxiliary information the corresponding general fields, if

they exist, take precedence. If the only possible classification symbol which can be allocated is a symbol in the group [B01F 15/00](#) then it has to be classified in the general field (e.g. if it can only be classified in [B01F 15/06](#) then it is a clear indication that it has to be classified in F28).

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this subclass, the following term or expression is used with the meaning indicated:*

Mixing	stirring of a single material
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## B01F 1/00

**Dissolving** ([N: without involving chemical reactions; [B01F 3/04099](#) takes precedence;] **separating by dissolving** [B01D](#); **dissolving to effect cooling** [F25D 5/00](#))

### Definition statement

*This subclass/group covers:*

Dissolving of a solid in a liquid in which no chemical reaction is involved (e.g. dissolving salt in water).

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Preparation of beverages	<a href="#">A47J 31/00</a>
Addition of cleaning agents in dishwashers	<a href="#">A47L 15/00</a>
Preparation of dialysates	<a href="#">A61M 1/16</a>
Dosing solid additives for water treatment	<b>C01F1/68</b>
Addition of cleaning agents in washing machines	<a href="#">D06F</a>
Preparation of brine for roads	<a href="#">E01H 10/00</a>

Dosing solid additives in swimming-pools	<a href="#">E04H 4/00</a>
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### **Special rules of classification within this group**

Mixing of a solid with a liquid for preparing dispersions or slurries, i.e. when the solid is not chemically dissolved in the liquid (e.g. a coal slurry) is not classified in this group.

### **B01F 1/0005**

**[N: Methods]**

### **Special rules of classification within this group**

Methods for dissolving a solid in a liquid which is only suited for dissolving a specific solid and which is not based on the use of mechanical devices (i.e. specific process recipes for dissolving a specific component, said recipe not being suited for dissolving any other solid) are not classified in this group.

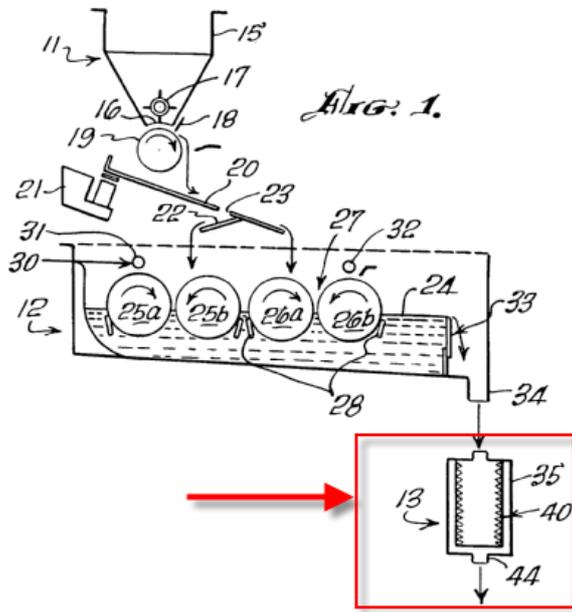
### **B01F 1/0016**

**[N: comprising constructions for blocking or redispersing undissolved solids, e.g. sieves, separators, guiding constructions ([B01F 1/0033](#) takes precedence)]**

### **Definition statement**

*This subclass/group covers:*

elements used for blocking undissolved solids, e.g. used as filters at the outlet of the container where the solid is being dissolved. Example:



## B01F 3/00

Mixing, e.g. dispersing, emulsifying, according to the phases to be mixed [N: ([C08J 3/02](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Devices in methods for mixing in which the phases of the materials to be mixed are of relevance.

### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Making solutions, dispersions or latices by other methods than by solution, emulsion or suspension polymerisation techniques	<a href="#">C08J 3/02</a>
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### Special rules of classification within this group

With regard to the phases to be mixed, the following is to be observed:

- when only a general reference to the phases is indicated, only the Indexing Codes [B01F 1/00](#) and [B01F 3/00](#) are used;

- if reference is made to the use of the device for any kind of mixtures, it is not classified in [B01F 1/00](#), [B01F 3/00](#), [B01F 1/00](#) or [B01F 3/00](#);
- when the application is of relevance (i.e. the type of product produced is claimed or the device is claimed for making a specific product) then it is also classified in the corresponding application field;
- if the possible application or applications are only mentioned in a generic way (i.e. as possible uses of the device) then the corresponding KW is used instead.

## **B01F 3/02**

**gases with gases or vapours [N: (for preparing respiratory gases or vapours [A61M 16/12](#))]**

### **Definition statement**

*This subclass/group covers:*

Mixing of two or more gases in which mixing devices are used for homogenizing the mixture.

### **References relevant to classification in this group**

*This subclass/group does not cover:*

Storage and distribution of gases	F17
Ventilation	<a href="#">F24F</a>

### **Special rules of classification within this group**

Generally, the mere contact of two or more gases for producing a specific composition when no mixing devices are used for actively homogenizing the mixture is not classified in this group.

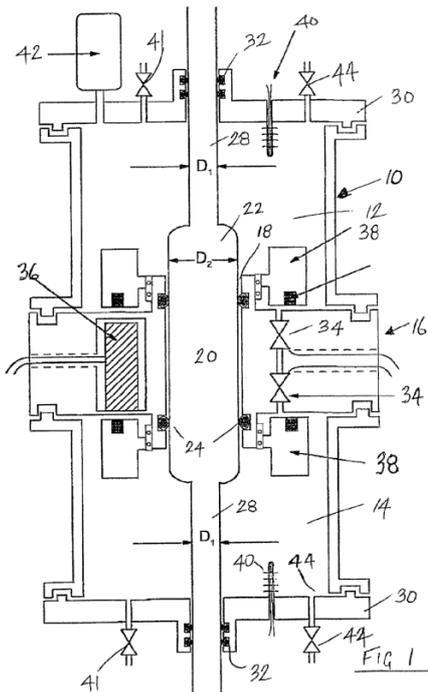
## **B01F 3/024**

**[N: with moving mixing elements, e.g. with liquid seal ([B01F 3/022](#) takes precedence)]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



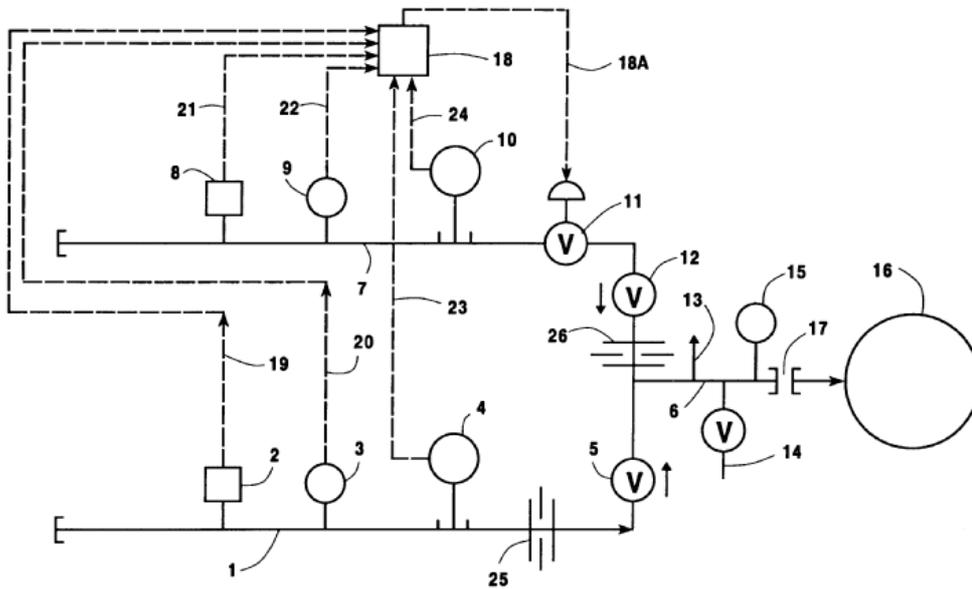
## B01F 3/026

[N: Mixing systems, i.e. flow charts or diagrams;  
Arrangements, e.g. comprising controlling means]

### Definition statement

*This subclass/group covers:*

*Illustrative example of subject matter classified in this group.*



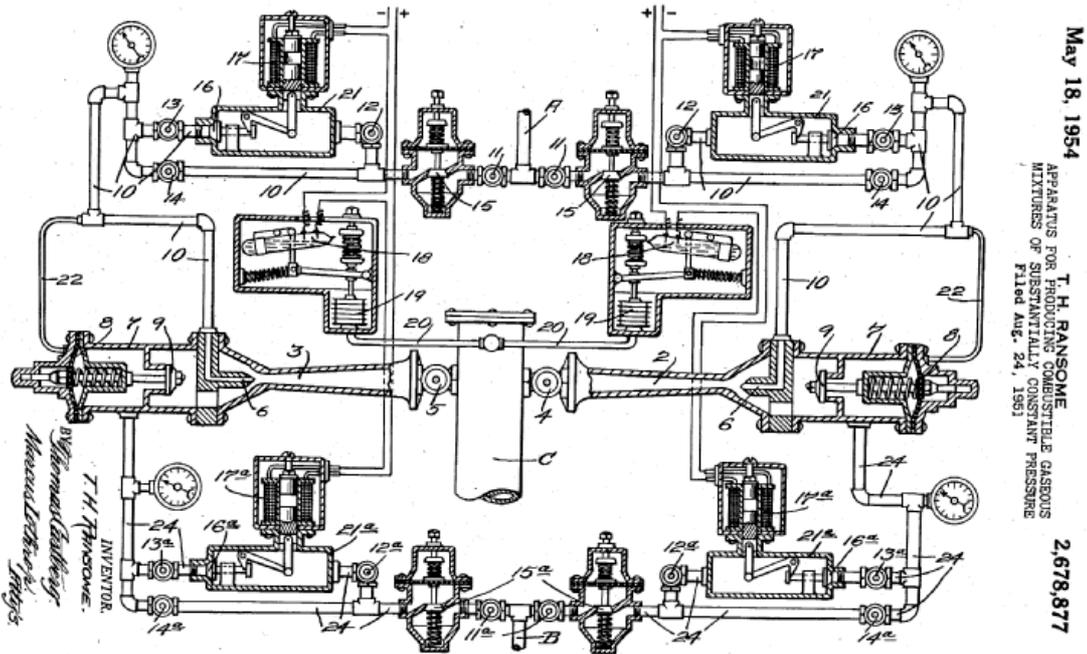
## B01F 3/028

[N: characterised by the construction of the controlling means]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 3/04007

[N: Introducing a liquid into a gaseous medium, e.g. preparation of aerosols (for air-conditioning [F24F 6/00](#))]

### Definition statement

*This subclass/group covers:*

Introducing a liquid into a gas for obtaining a dispersion of droplets of liquid in the gas, wherein the gas is not merely used as a carrier but it is one of the components of the mixture, e.g. mixing of a reducing agent (e.g. ammonia) with a flue gas (the gas does not act as a mere carrier).

### Special rules of classification within this group

Introduction of a liquid in a gas, the gas acting as a mere carrier or as means for braking a stream of liquid into droplets, e.g. for spraying of the liquid, is not classified in this group.

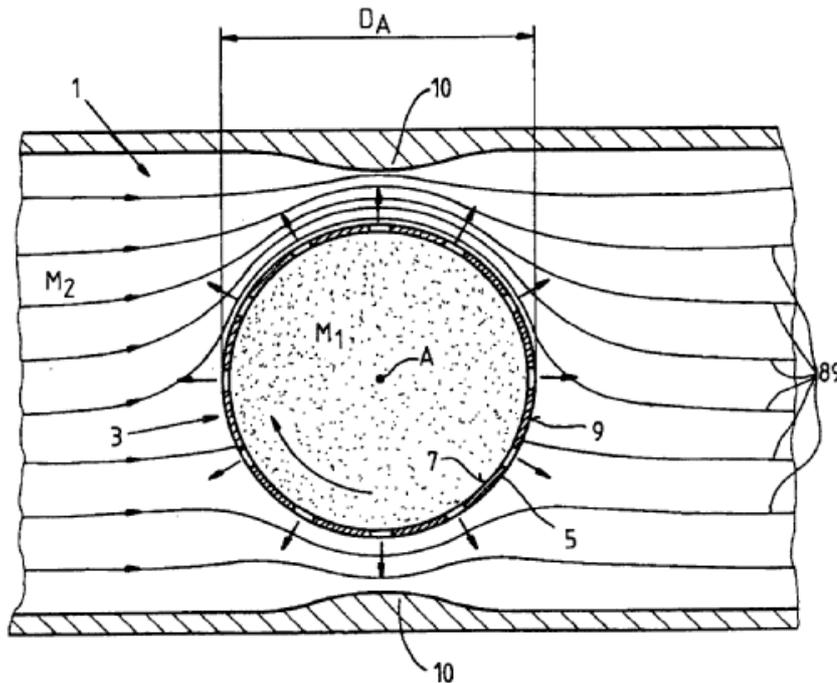
## B01F 3/04028

[N: using rotating elements, e.g. rolls, brushes]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group (EP1319435):



## B01F 3/04035

[N: for spraying the liquid radially by centrifugal force]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

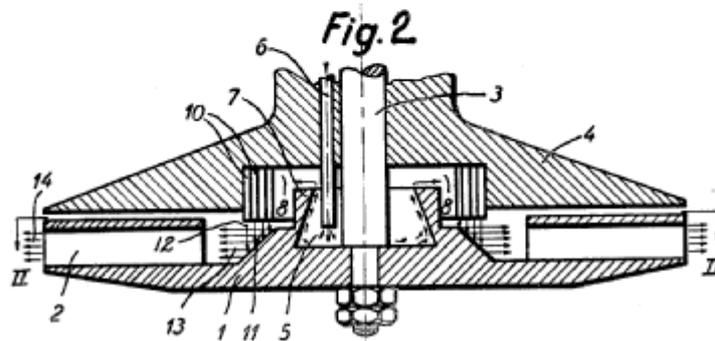
July 14, 1953

J. E. NYROP  
LIQUID ATOMIZER

2,645,525

Filed April 18, 1949

3 Sheets-Sheet 2



### B01F 3/04049

[N: using nozzles]

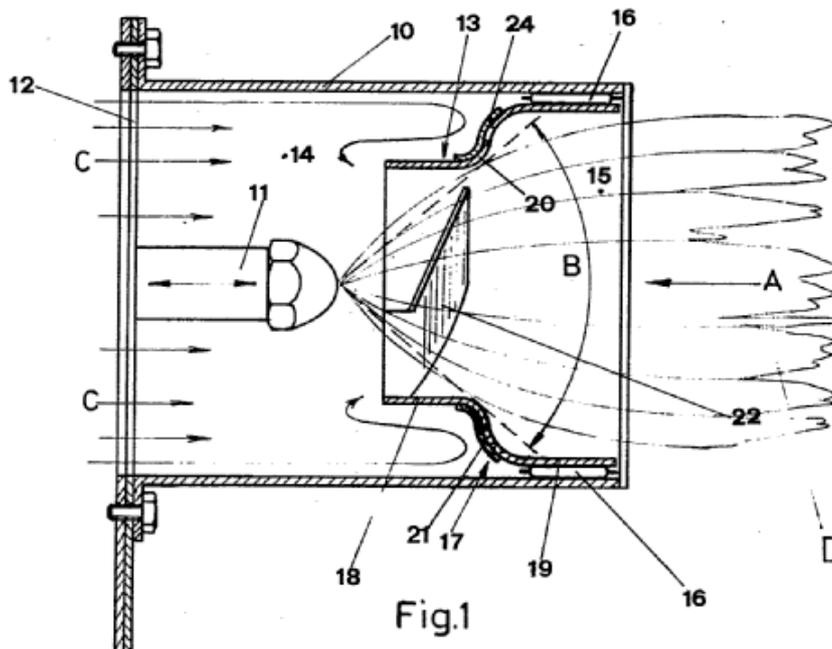
#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

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### B01F 3/04078

[N: using a gas-liquid mixing column or tower (absorbing



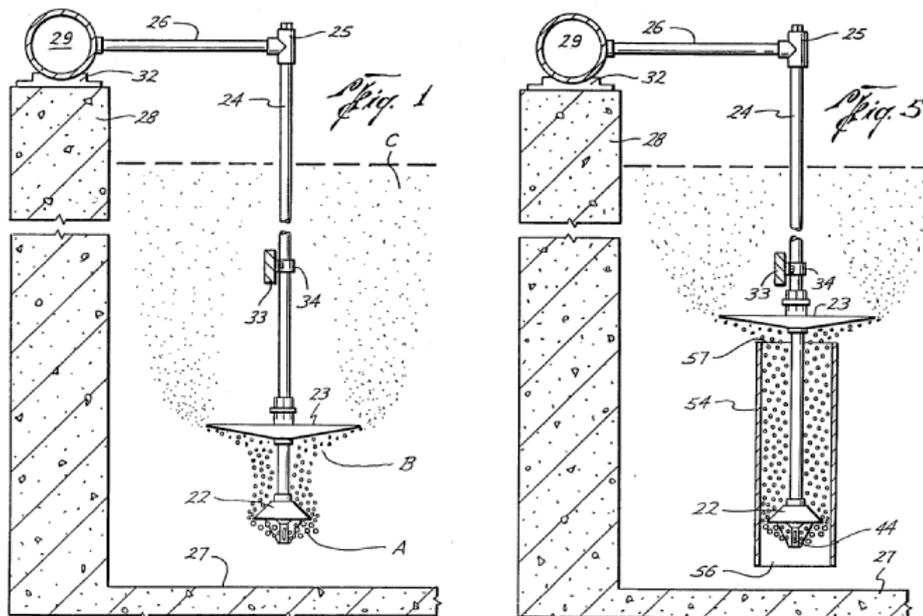
**B01F 3/04106**

[N: the gas being introduced by bubbling, e.g. within receptacles or tanks ([B01F 3/04531](#), [B01F 3/04787](#) take precedence; introducing gas for agitation only [B01F 13/02](#))]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



U.S. Patent Sep. 5, 1989 Sheet 1 of 2 4,863,644

**B01F 3/04113**

[N: Arrangement or manipulation of the gas bubbling devices]

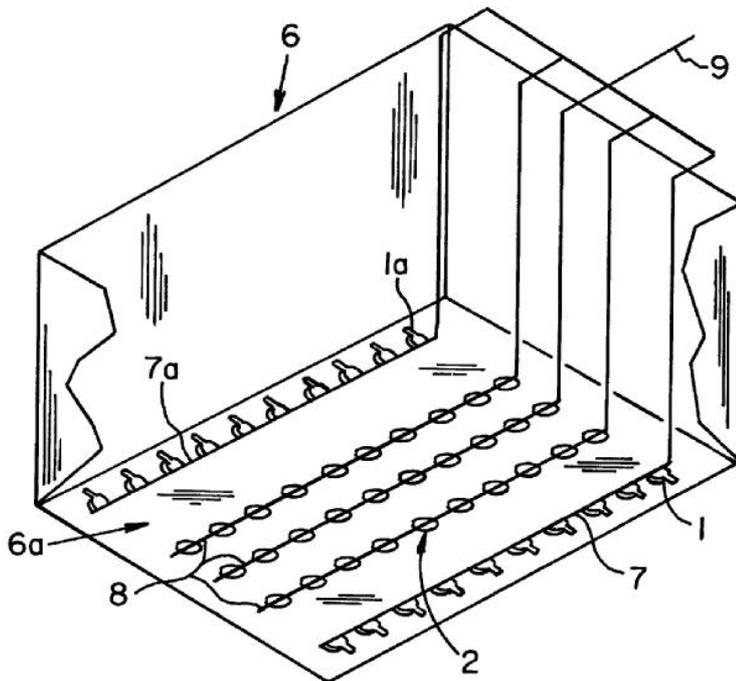
**Definition statement**

*This subclass/group covers:*

Ways of arranging the bubbling elements within the basin or receptacle (e.g. forming a network, on grids, etc.) and elements for manipulating the bubbling elements (e.g. for introducing/elevating them in/from the basin or receptacle).

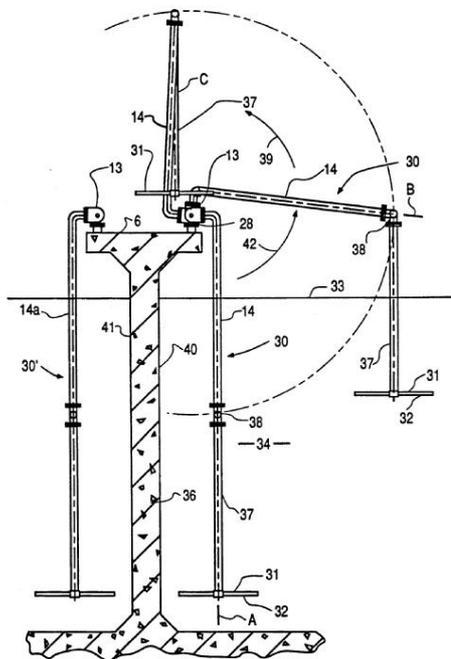
Examples:

- Characterized by the disposition of the bubbling elements:



- Characterized by means for the manipulation of the bubbling elements:

U.S. Patent Feb. 11, 1992 Sheet 3 of 5 5,087,391



**B01F 3/0412**

[N: Mounting the bubbling devices or the diffusers ([B01F 3/04241](#) takes precedence)]



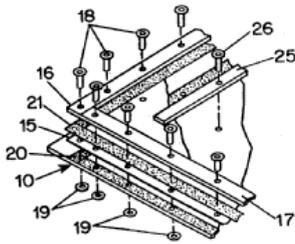
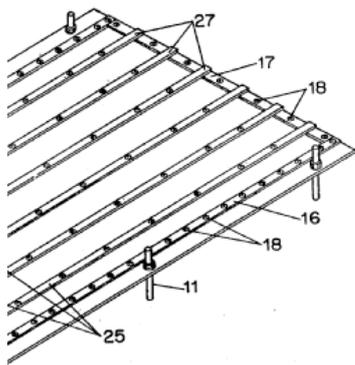


FIG. 2

U.S. Patent

Mar. 9, 1993

5,192,467

Characterized by the shape of the bubbling element, e.g. boxes, discs, domes, plates, rings, coiled tubes, stacked elements, tubes, membranes, etc.

Characterized by elements for protecting the bubbling elements.

Characterized by the material with which the diffuser is made, e.g. biocide material, material comprising means for gas storage.

## B01F 3/04248

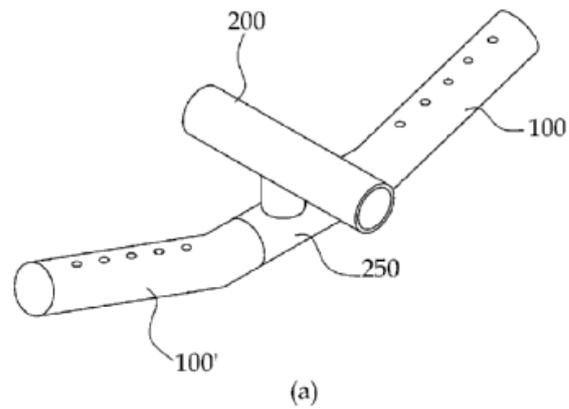
[N: having injection means, e.g. nozzles with circumferential outlet]

### Definition statement

*This subclass/group covers:*

Diffusers wherein the gas is fed through injection means, e.g. nozzles.

Example:

**Figure 4****B01F 3/04255**

[N: having elements opening under air pressure, e.g. valves]

**Definition statement**

*This subclass/group covers:*

Diffusers wherein the gas is fed through mechanical elements which open under air pressure.

Example:

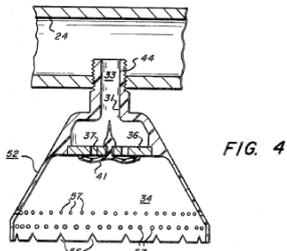


FIG. 4

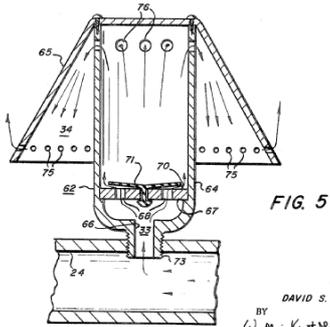


FIG. 5

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DAVID S. MAC LAREN  
BY  
William Kent Strong & Root  
Attys.

### B01F 3/04262

[N: consisting of rigid porous or perforated material]

#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication Jun. 17, 2010 Sheet 3 of 7 US 2010/0147690 A1

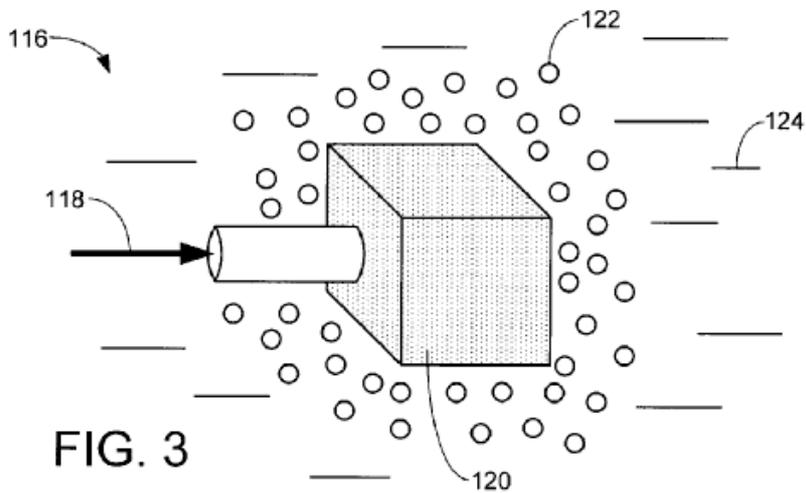


FIG. 3

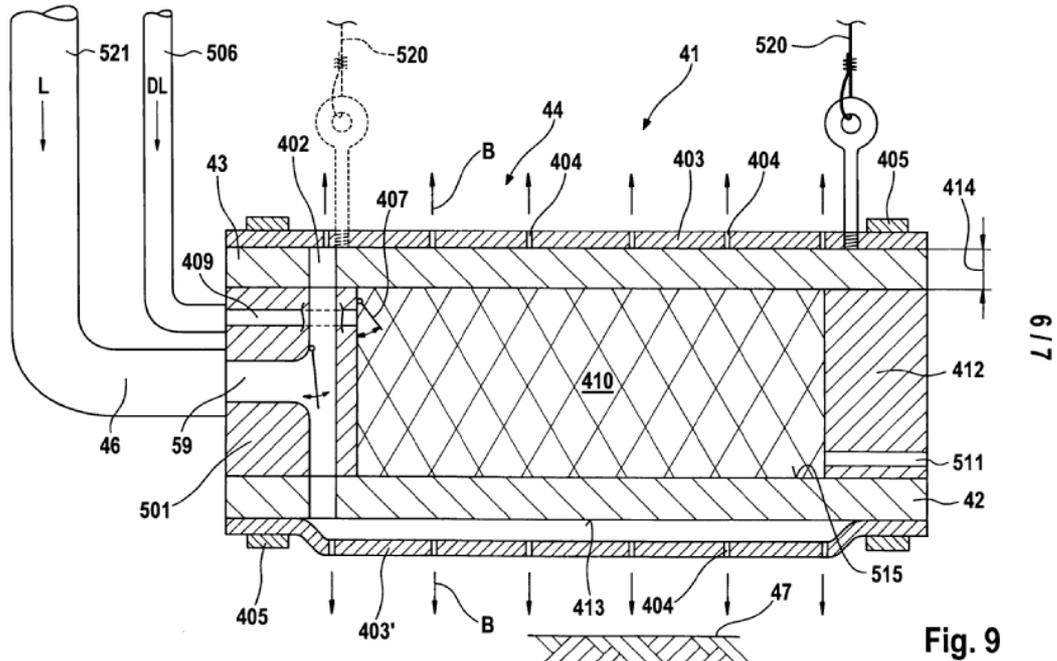
## B01F 3/04269

[N: consisting of flexible porous or perforated material, e.g. fabric]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 3/04446

[N: Making foam (for cocoa products [A23G 1/105](#); for sweet meats [A23G 3/0221](#); for fire-extinguishing foam [A62C 5/02](#); spray pistols for making foam [B05B 7/0018](#); foam used in forming crevices or fractures for stimulation of oil production [E21B 43/26](#))]

### Definition statement

*This subclass/group covers:*

Devices and methods for producing foam by mixing a gas and a liquid (including, e.g., a foaming agent) using mechanical means. Example:

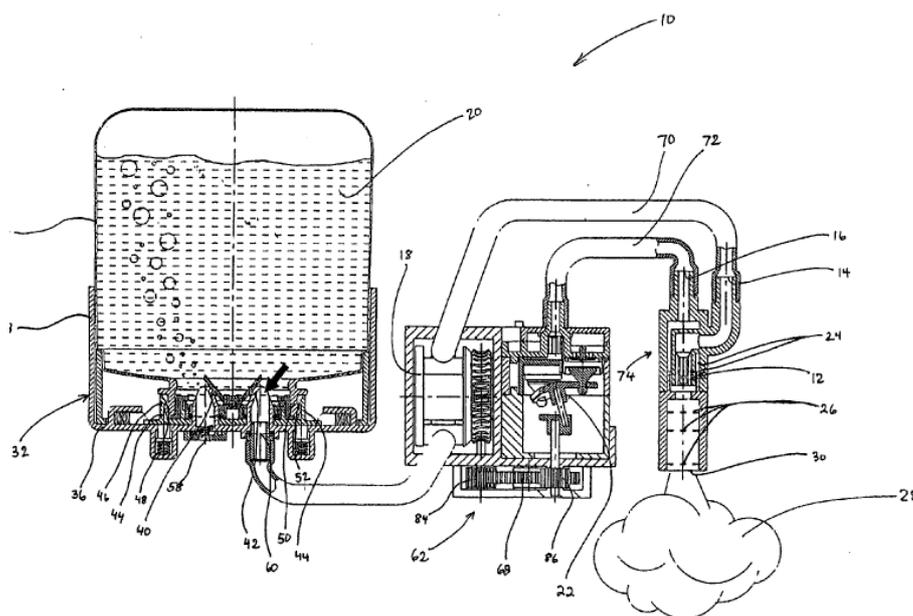


Fig. 1

## B01F 3/0446

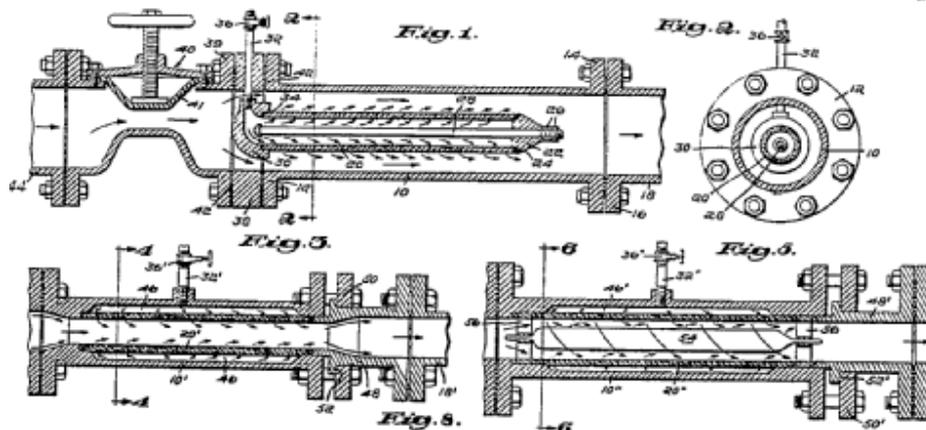
[N: using flow mixing means for introducing the gas, e.g. in conduits or in vessels ([B01F 3/04106](#), [B01F 3/0876](#) take precedence; distillation in which liquids are contacted with gaseous media [B01D 3/00](#); jet regulation with aerating means for fresh water plumbing installations [E03C 1/084](#))]

### Definition statement

*This subclass/group covers:*

Means for mixing a gas with a liquid using flow mixing means other than by merely bubbling elements.

Example:



### Special rules of classification within this group

The specific flow mixer used must be classified accordingly (e.g. in the corresponding mixing means described in main group [B01F 5/02](#)).

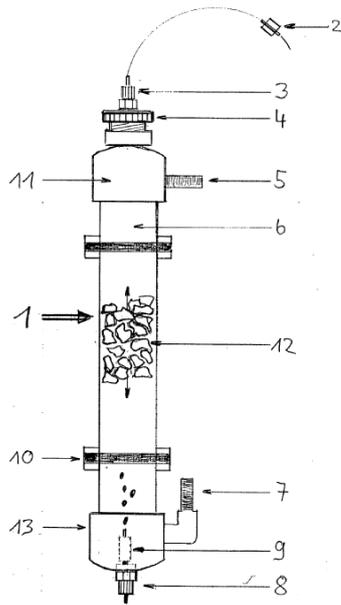
### B01F 3/04468

[N: by moving liquid and gas in counter current (absorbing units for separating gases or vapours [B01D 53/18](#); in heat exchange apparatus [F28C 3/06](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 3/04475

[N: the liquid flowing in a thin film to absorb the gas (fractional distillation with fractionating columns in which vapour bubbles through liquid [B01D 3/16](#))]

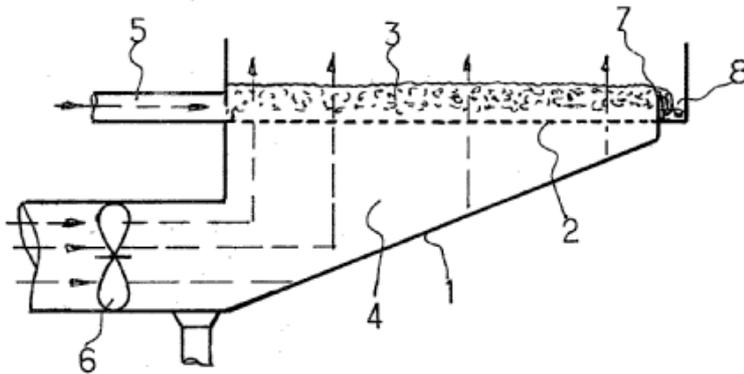
### Definition statement

*This subclass/group covers:*

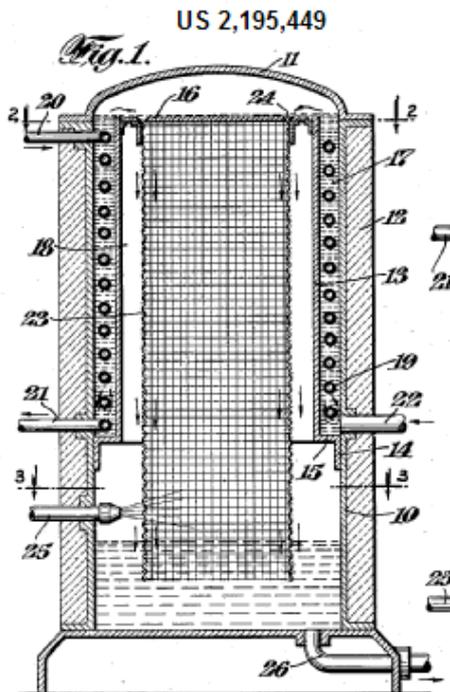
Examples:

The thin film flowing horizontally or inclined:

Fig.1



The thin film flowing vertically:



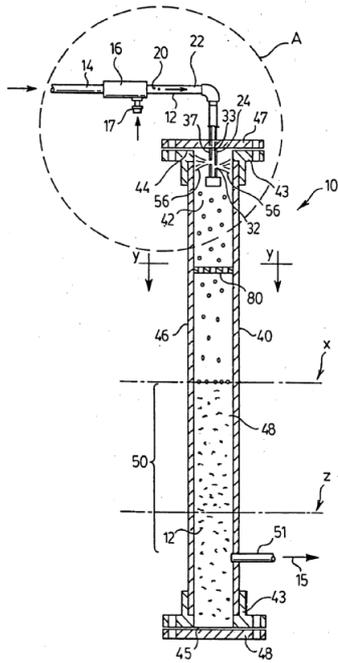
**B01F 3/04496**

[N: using columns, e.g. multistaged columns]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



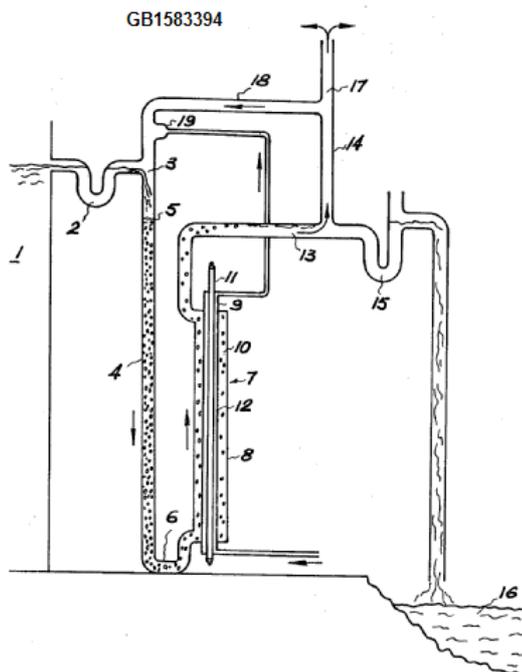
**B01F 3/04503**

[N: by circulating the flow in guiding constructions or conduits]

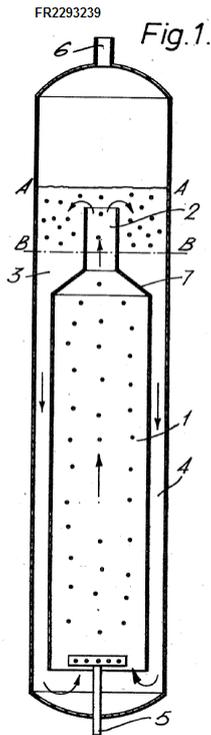
**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.







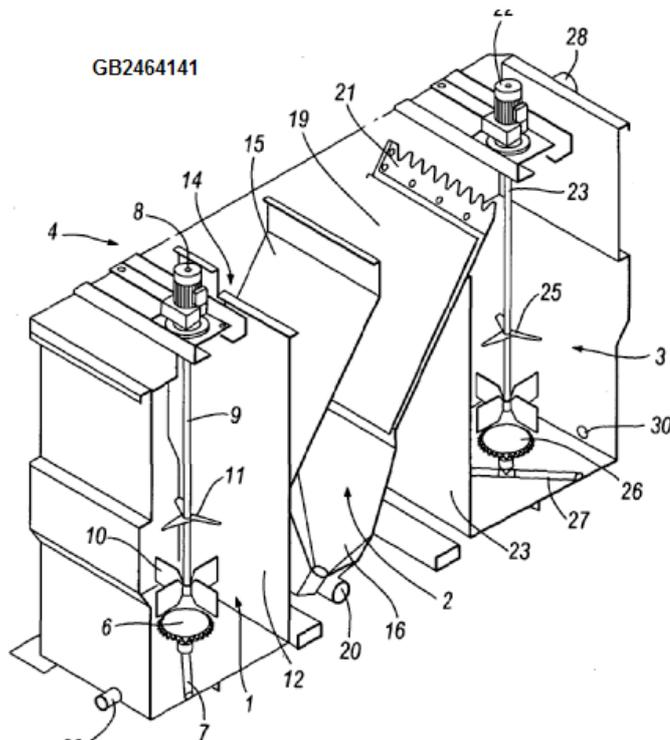
## **B01F 3/04531**

[N: using driven stirrers with completely immersed stirring elements ([B01F 3/04453](#) takes precedence; surface aerating with stirrers near to the surface [B01F 3/04765](#); flotation machines [B03D 1/16](#))]

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



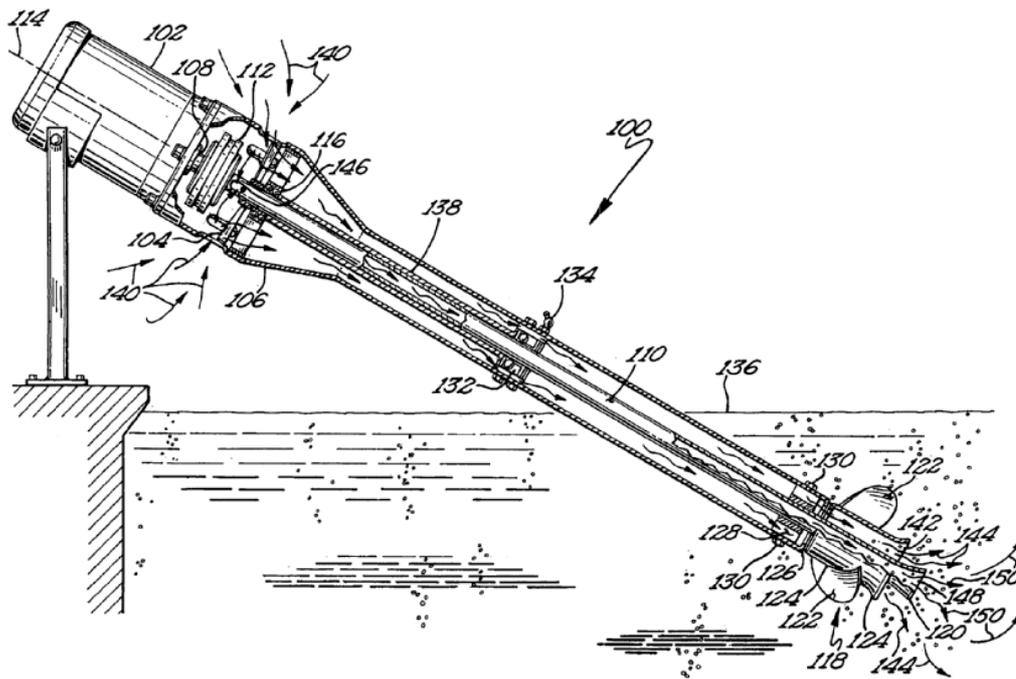
## B01F 3/04539

characterised by the introduction of the gas along the axis of the stirrer or along the stirrer elements

### Definition statement

*This subclass/group covers:*

Driven stirrers with associated gas introduction means (e.g. through the shaft, through a tube parallel or surrounding the shaft, etc.). Example:



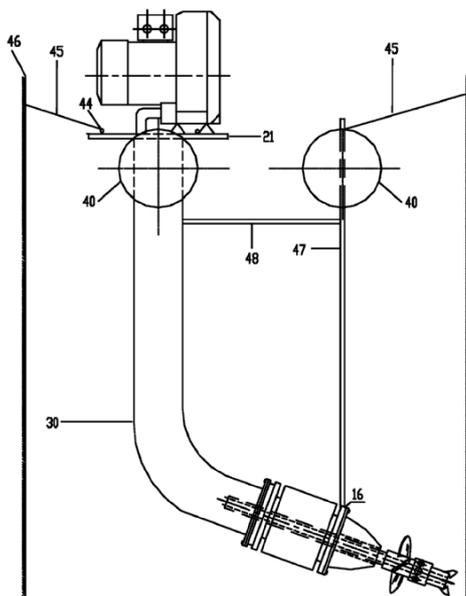
## B01F 3/04588

[N: the stirrer rotating about a horizontal axis; Stirrers therefor ]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 3/04595

[N: Single stirrer-drive aerating units, e.g. with the stirrer-head pivoting around an horizontal axis]

### Definition statement

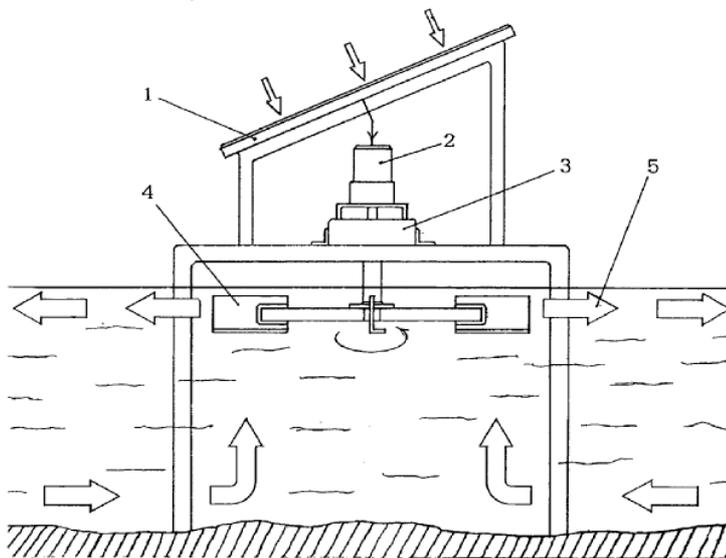
*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication May 10, 2007

US 2007/0104025 A1

Fig. 1



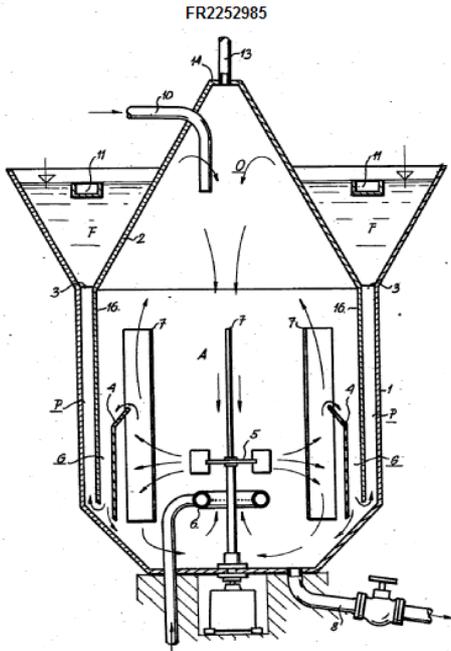
## B01F 3/04602

[N: provided with stationary guiding means surrounding at least partially the stirrer]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



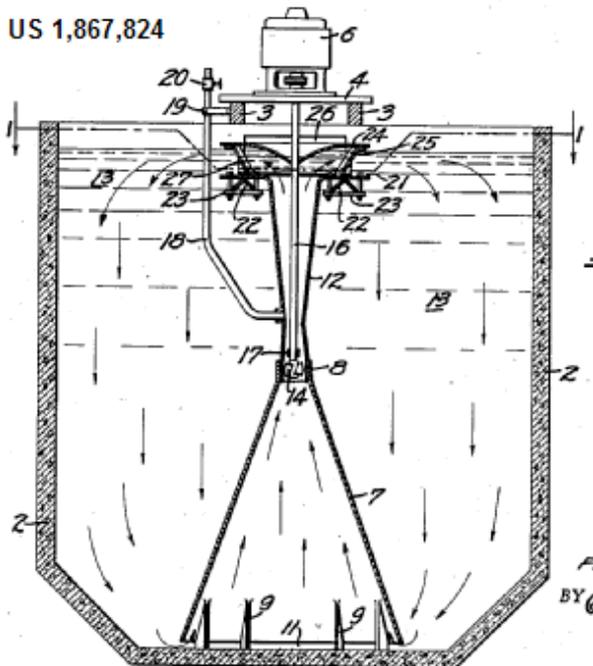
## B01F 3/04609

[N: with tubes surrounding the stirrer]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



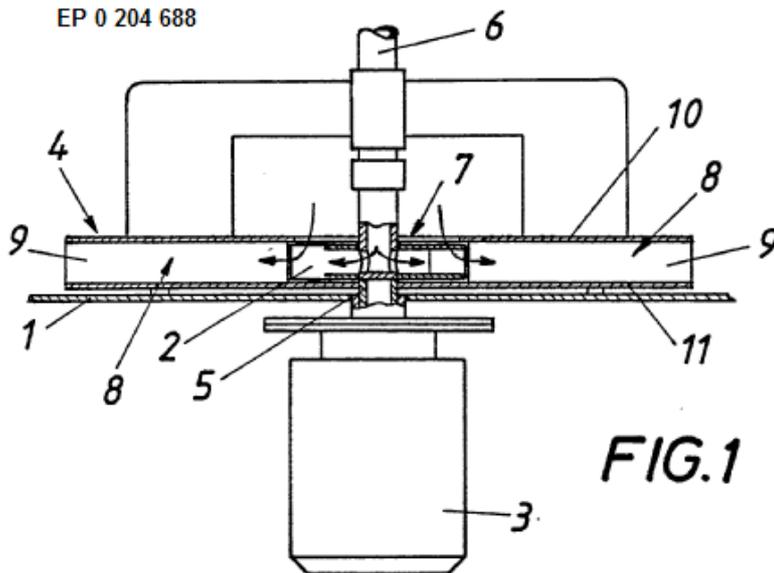
## B01F 3/04617

[N: the stirrer being of the centrifugal type, e.g. with a surrounding stator]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 3/0473

[N: Surface aerating, e.g. by cascading, spraying or projecting a liquid into a gaseous atmosphere (direct-contact heat exchange apparatus, the heat-exchange media being a liquid and a gas or a vapour [F28C 3/06](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

GB699310

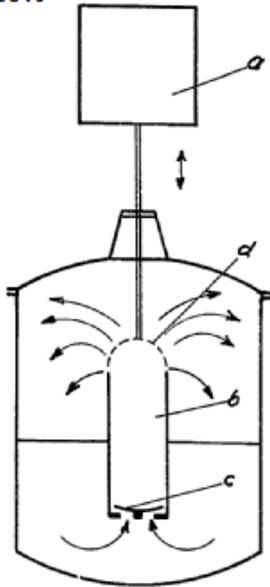


Fig. 1

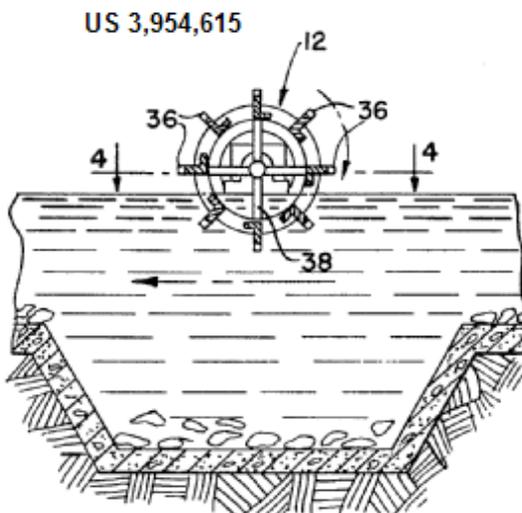
## B01F 3/04765

[N: with stirrers near to the liquid surface, e.g. partially immersed, for spraying the liquid in the gas or for sucking gas into the liquid, e.g. using stirrers rotating around a horizontal axis or using centrifugal force]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



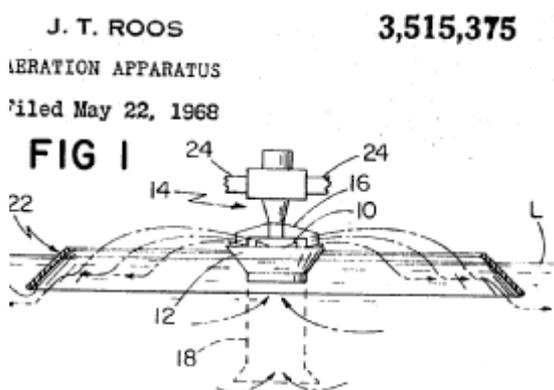
## B01F 3/04773

[N: the stirrers rotating about a vertical axis]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



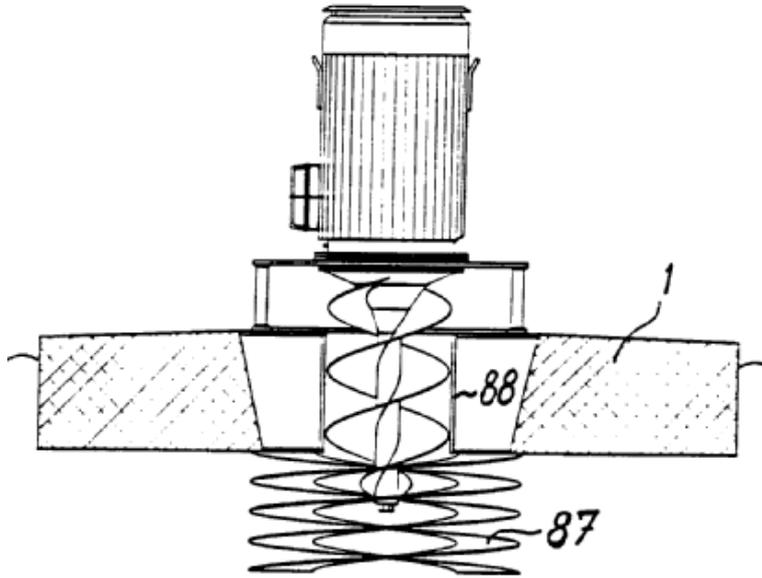
## B01F 3/0478

[N: Stirrers therefor]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



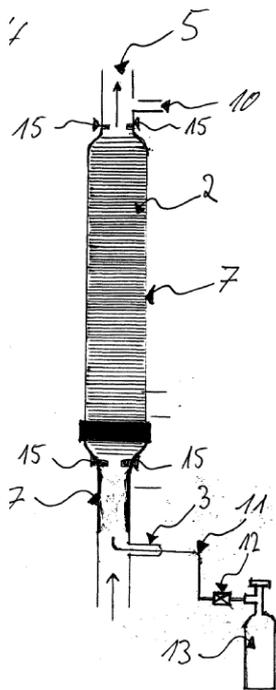
### **B01F 3/04787**

[N: Apparatus for aerating or carbonating beverages ([B01F 3/0446](#), [B01F 3/04978](#) take precedence; using effervescence-generating compositions, e.g. carbon dioxide tablets [A23L 2/40](#))]

#### **Definition statement**

*This subclass/group covers:*

Devices for aerating and/or carbonating beverages in which the way of introducing the gas and homogenizing the mixture is of relevance. Example:



## References relevant to classification in this group

*This subclass/group does not cover:*

Dispensers for beverages in draught	<a href="#">B67D 1/00</a>
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## Special rules of classification within this group

General construction details of a beverage producing machine (e.g. cooling group, dispensing means, general construction of the machine) are not classified in this group.

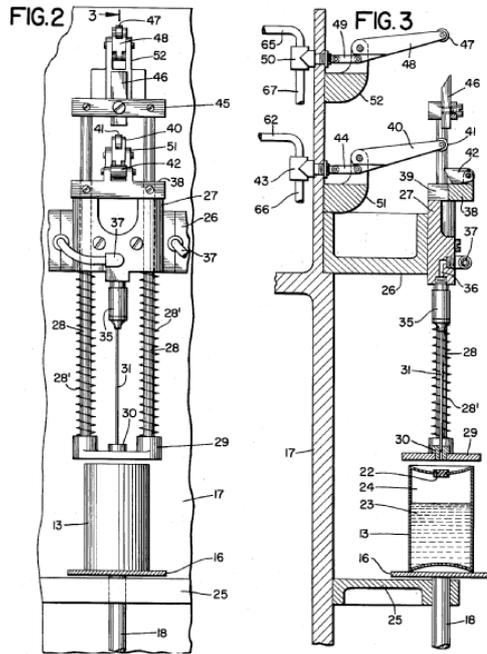
## B01F 3/04794

[N: for aerating or carbonating beverages within containers, e.g. bottles]

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



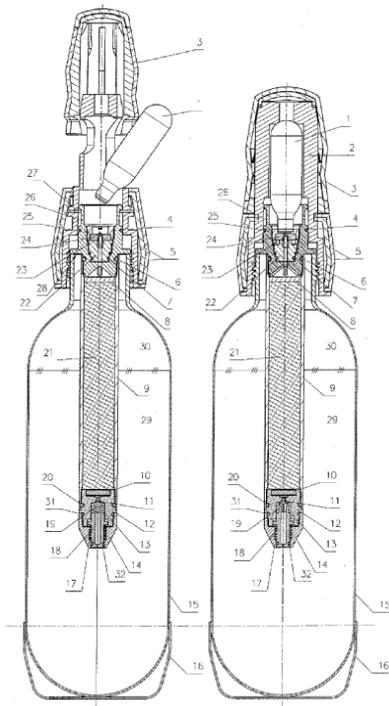
## B01F 3/04801

[N: Portable appliances comprising a gas cartridge]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



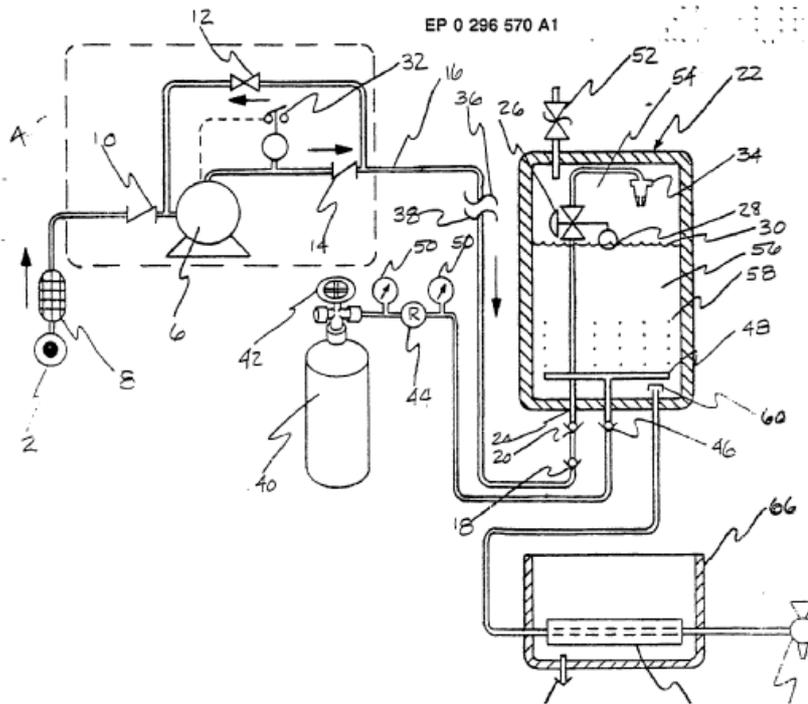
## B01F 3/04808

[N: for aerating or carbonating within receptacles or tanks, e.g. distribution machines ([B01F 3/04794](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



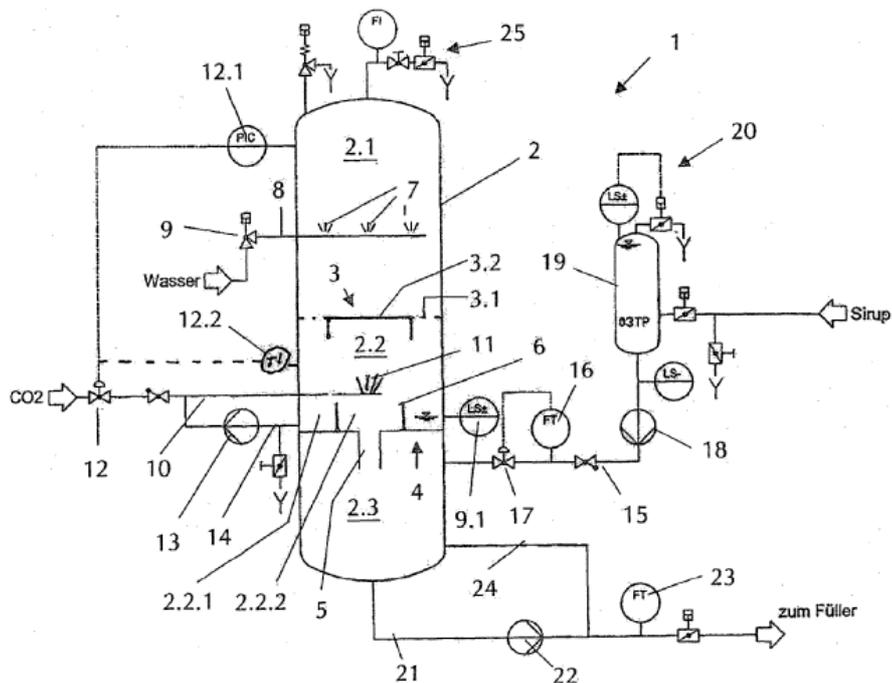
## B01F 3/04815

[N: Mixing systems, i.e. flow charts or diagrams;  
Arrangements, e.g. comprising controlling means]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



DE 10 2009 054 313 A1 2011.05.26  
 Anhängende Zeichnungen

## B01F 3/04829

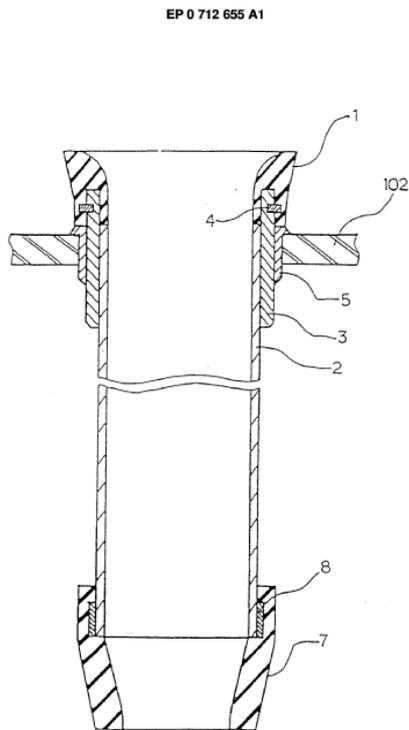
[N: Parts; Accessories]

### Definition statement

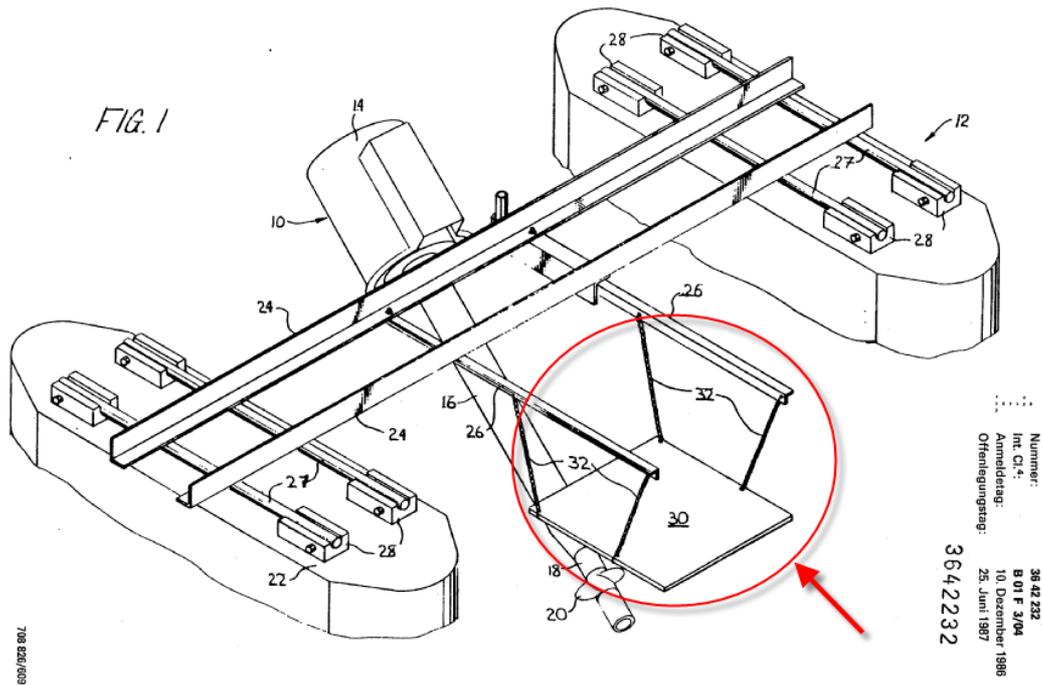
*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

Parts:



Accessories:



Nummer: 36 42 232  
 Int. Cl.: B 01 F 3/04  
 Anmeldetag: 10. Dezember 1986  
 Offenlegungstag: 25. Juni 1987  
 3642232

**B01F 3/04985**

[N: Mixing systems, i.e. flow charts or diagrams]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

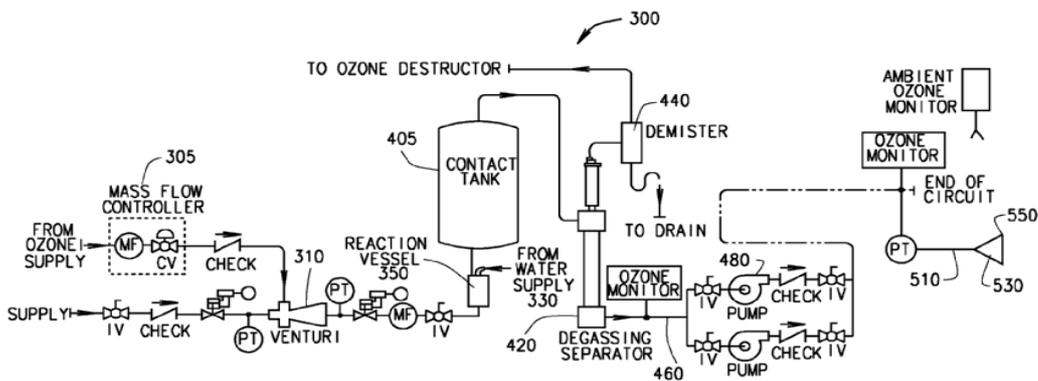


FIG. 5

**B01F 3/06**

## gases or vapours with solids

### References relevant to classification in this group

*This subclass/group does not cover:*

Pneumatic transport of solids in bulk	<a href="#">B65G 53/00</a>
---------------------------------------	----------------------------

## B01F 3/0807

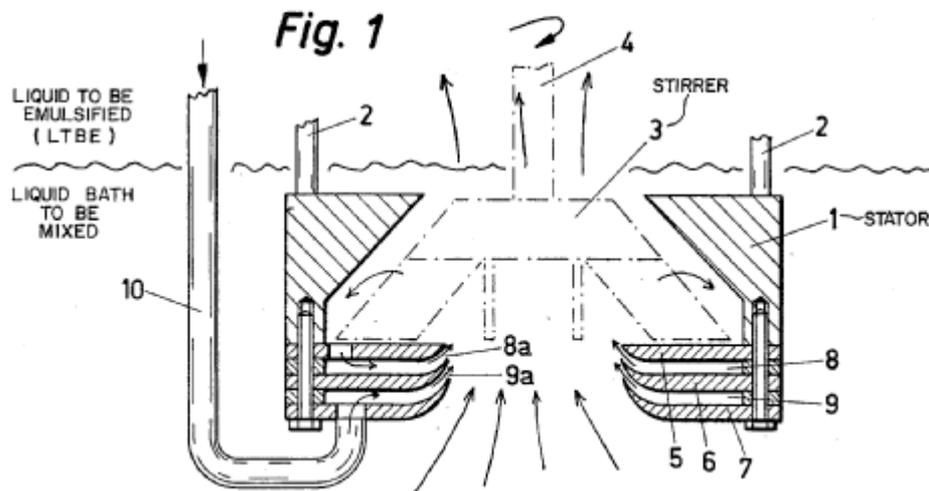
[N: Emulsifying (homogenising milk [A01J 11/16](#); for adding a water-fuel emulsion in engine-pertinent apparatus [F02M25/02B](#); for preparing emulsion of liquid fuel with other fluid(s) for feeding combustion apparatus [F23K 5/12](#))]

### Definition statement

*This subclass/group covers:*

Devices and methods for producing emulsions by means of stirring means.

U.S. Patent Dec. 9, 1975 Sheet 1 of 2 3,925,243



### References relevant to classification in this group

*This subclass/group does not cover:*

Cosmetics	<a href="#">A61K7/00</a>
Medical compositions	<a href="#">A61K 9/00</a>

Use of substances as emulsifying agents (in general)	<a href="#">B01F 17/00</a>
--	----------------------------

### Special rules of classification within this group

The specific type of mixer is to be classified accordingly, i.e. in [B01F 5/00](#), [B01F 7/00](#), [B01F 9/00](#), [B01F 11/00](#) and [B01F 13/00](#). Specific details are to be classified in [B01F 15/00](#).

Methods (and devices) in which the emulsifying process is specific for the production of a specific product and it is performed on the base of a "recipe" (i.e. steps involving the order of addition of the materials, temperature/pressure conditions, specific type of products with specific compositions, etc.), in which a mechanical homogenizing step is of no or little reference are not classified in this group. Also the production of specific compounds in the form of emulsion are classified in the related application and not here.

### B01F 3/0853

**[N: Mixing liquids using driven stirrers]**

### Special rules of classification within this group

The specific type of driven stirrer is to be accordingly classified in [B01F 7/00](#), [B01F 9/00](#), [B01F 11/00](#) or [B01F 13/00](#).

### B01F 3/0861

**[N: Mixing liquids using flow mixing]**

### Special rules of classification within this group

The specific type of flow mixer is to be accordingly classified in [B01F 5/00](#).

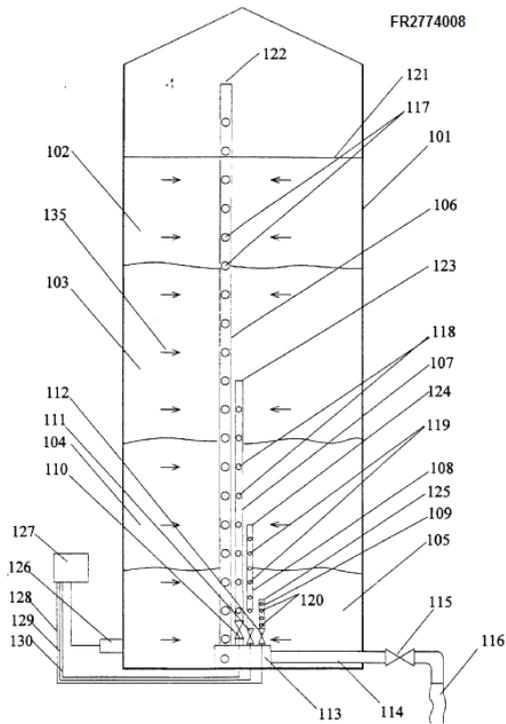
### B01F 3/0869

**[N: by uniting flows taken from different parts of a receptacle or silo; Sandglass-type mixing (for particulate material [B01F 5/24](#))]**

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



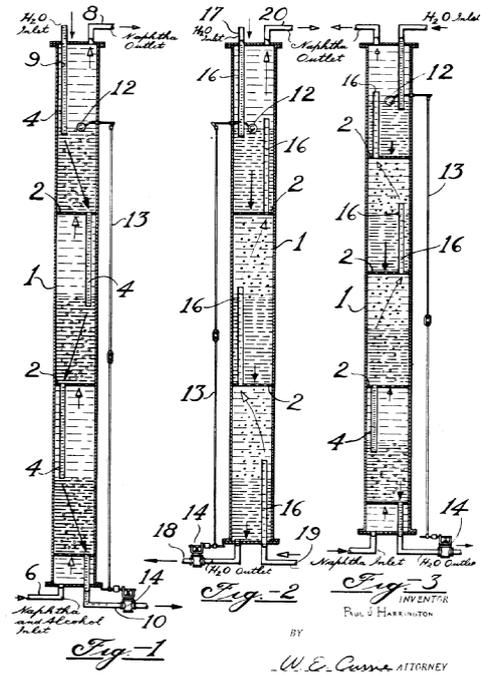
## B01F 3/0873

[N: by moving the liquids in countercurrent]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



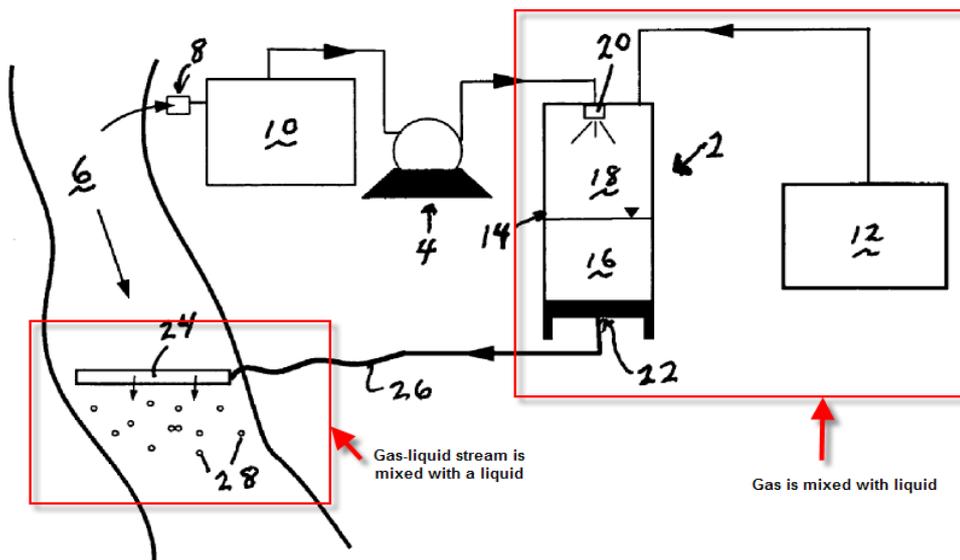
**B01F 3/0876**

[N: by injecting a mixture of liquid and gas]

**Definition statement**

This subclass/group covers:

The mixing of a stream or body of a gas containing liquid with another stream or body of liquid. Example:



US 2005/0279713A1

## B01F 3/182

[N: using a receptacle provided at its bottom discharge opening with oscillating or vibrating opening and closing elements, or with elements fitted on moving chains]

### Definition statement

*This subclass/group covers:*

Vibrating elements located in the bottom discharge opening of a receptacle with mixing elements for homogenizing the mixture of solids as it is discharged from the container.

Example:

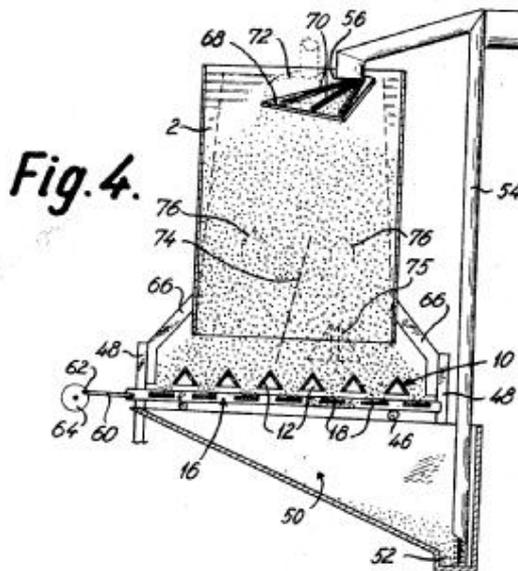
June 27, 1967

H. P. PEDERSEN  
MIXING APPARATUS

3,327,611

Filed Feb. 15, 1966

2 Sheets-Sheet 2



### References relevant to classification in this group

*This subclass/group does not cover:*

Elements for improving the discharge of containers or silos, preventing bridge formation

[B65D 88/00](#)

## B01F 3/184

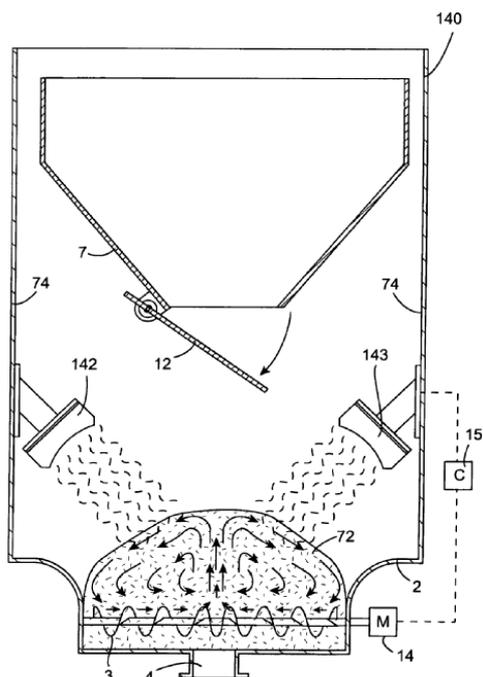
**[N: using rotatable mixing elements at the lower end of discharge hoppers]**

**Definition statement**

*This subclass/group covers:*

Rotatable elements located in the bottom discharge opening of a receptacle with mixing elements for homogenizing the mixture of solids as it is discharged from the container. Example:

EP 2 143 484 A1



**References relevant to classification in this group**

*This subclass/group does not cover:*

Elements for improving the discharge of containers or silos, preventing bridge formation	<a href="#">B65D 88/00</a>
--	----------------------------

**B01F 3/20**

**Pretreatment of the materials to be mixed [N: ([B28C 5/404](#), [B29B 7/905](#) take precedence)]**

**Definition statement**

*This subclass/group covers:*

Treatment of the materials to be fed to the mixer, e.g. heating, cooling, drying,

grinding, irradiating, sieving always in combination with the mixing device or method.

## References relevant to classification in this group

*This subclass/group does not cover:*

Pre-treatment of fibres	<a href="#">B28C 5/404</a> ,
Pre-treatment of fibres with means for pretreatment of the charges or fibres]	<a href="#">B29B 7/905</a>

## Special rules of classification within this group

The specific treatments per se are not classified here (i.e. when said operation is the relevant information). Said specific operations are covered by the corresponding general field.

### **B01F 3/22**

#### **Aftertreatment of the mixture**

#### **Definition statement**

*This subclass/group covers:*

Treatment of the product discharged from the mixer, e.g. heating, cooling, drying, grinding, irradiating, sieving always in combination with the mixing device or method.

## Special rules of classification within this group

The specific treatments per se are not classified here (i.e. when said operation is the relevant information). Said specific operations are covered by the corresponding general field.

### **B01F 5/00**

**Flow mixers (sprayers, atomisers [B05B](#)); Mixers for falling materials, e.g. solid particles ([B01F 13/04](#) takes precedence; centrifugal mixers [B04](#))**

#### **Definition statement**

*This subclass/group covers:*

The mixing of materials by means of flow mixers, e.g. without using driven mechanical elements (i.e. using passive mixing elements).

This group also covers pumps used for mixing purposes.

## References relevant to classification in this group

*This subclass/group does not cover:*

Mixers combined with safety devices	<a href="#">B01F 13/04</a>
-------------------------------------	----------------------------

## Special rules of classification within this group

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

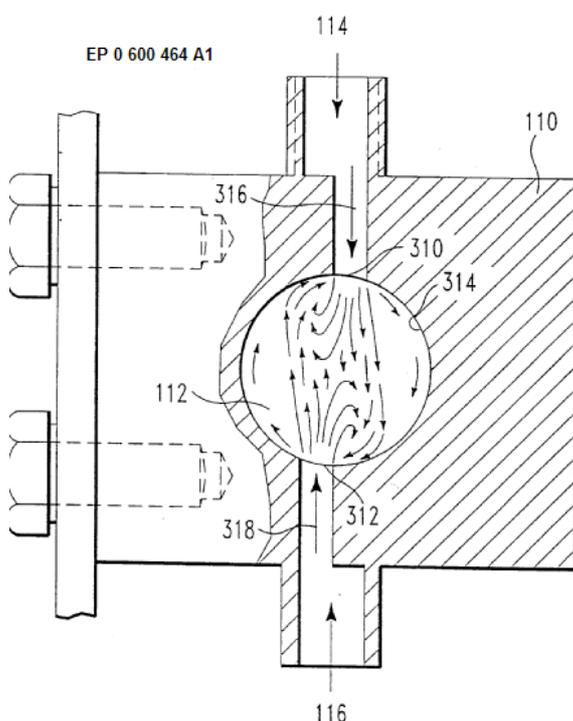
### B01F 5/0057

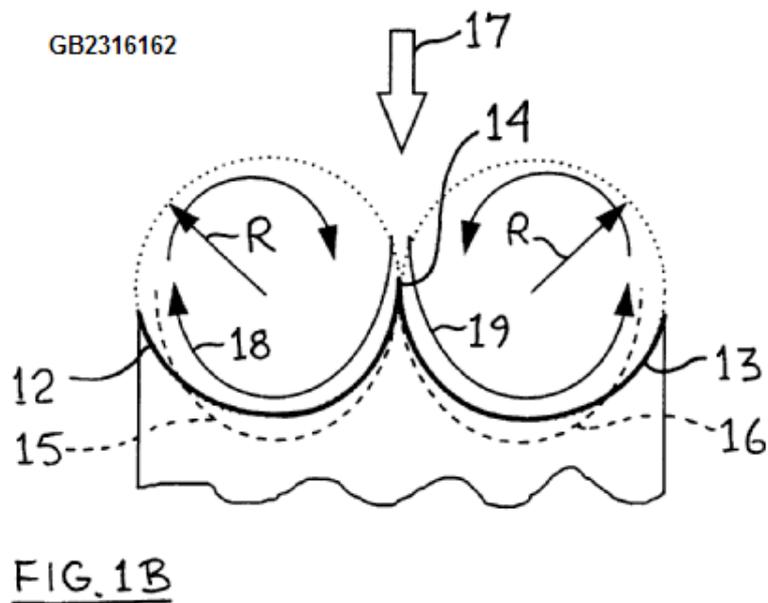
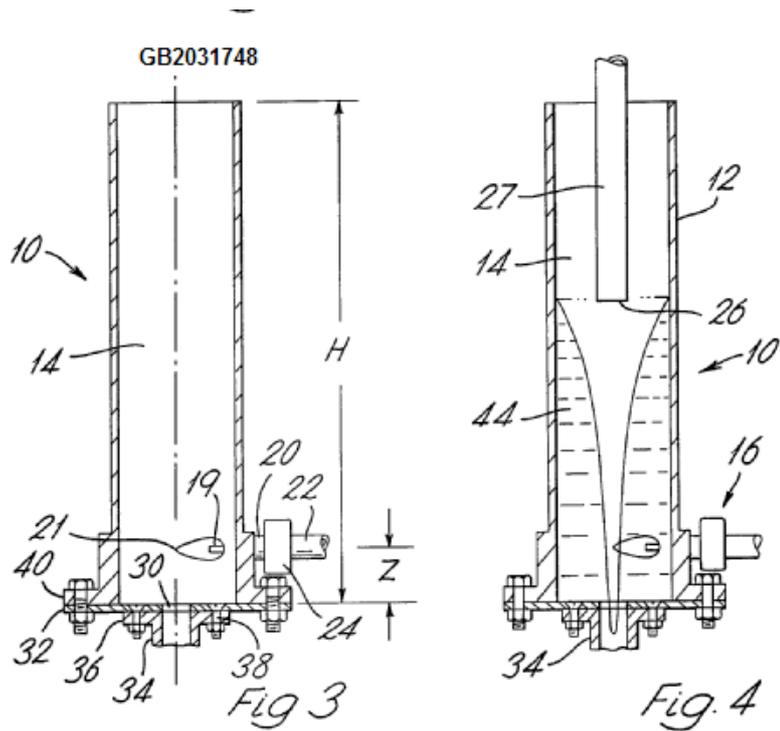
[N: Mixing by creating a vortex flow, e.g. by tangentially introducing jets (apparatus using free vortex flow in general [B04C](#))]

### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.





## B01F 5/0068

[N: Characterised by the arrangement of the discharge opening]

### Definition statement

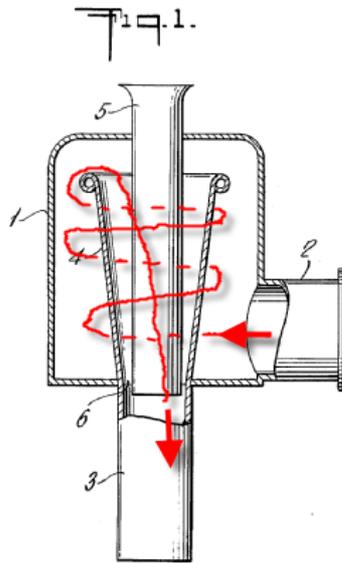
*This subclass/group covers:*

Vortex mixer in which the discharge of the mixing chamber is located in a

specific way so as to influence the movement of the material within the chamber.

Example:

U.S. Patent June 1, 1976 Sheet 1 of 2 3,960,175



## B01F 5/0077

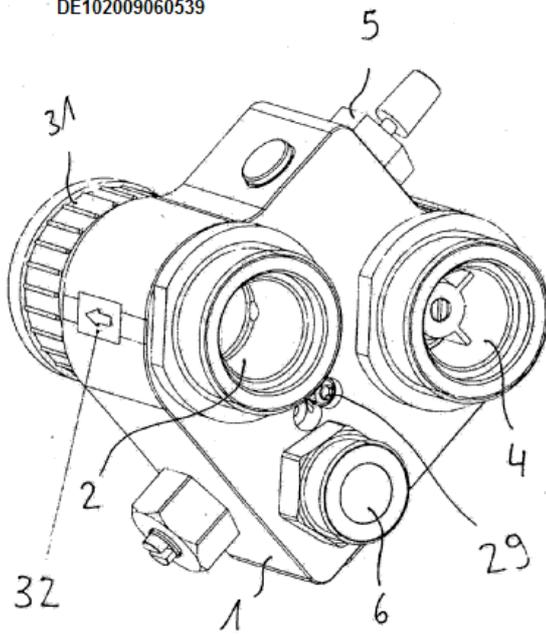
[N: Mixing heads, i.e. compact mixing units or modules, using mixing valves for feeding and mixing at least two components (for homogenizing mixtures [B01F 5/0661](#), mixing valves [F16K 11/00](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

DE102009060539



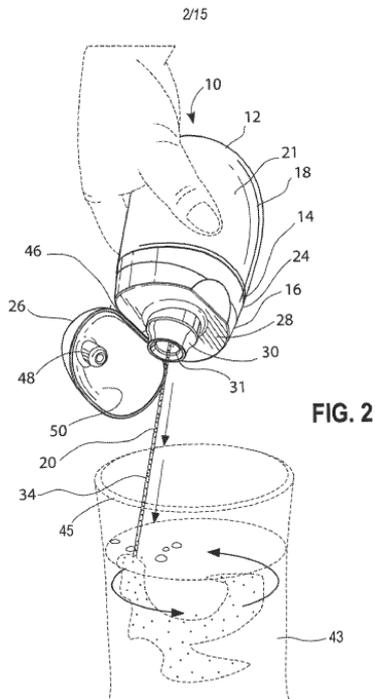
## **B01F 5/02**

**Jet mixers [N: ([B01F 5/0057](#) take precedence; with gas agitation, i.e. for fluidisation [B01F 13/02](#))]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



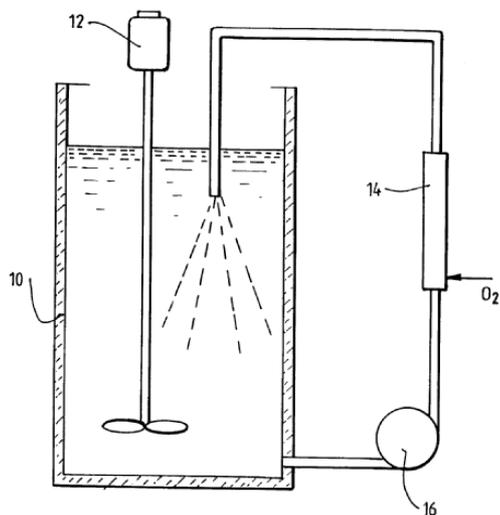
## **B01F 5/0206**

[N: comprising submerged injectors, e.g. nozzles, for injecting high pressure jets in a large volume or in a mixing chamber ([B01F 3/04106](#) takes precedence; injecting an additional component in a conduit [B01F 5/0403](#))]

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this group

*This subclass/group does not cover:*

the gas being introduced by bubbling	<a href="#">B01F 3/04106</a>
--------------------------------------	------------------------------

### **B01F 5/0212**

**[N: the injectors being surrounded by guiding tubes]**

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

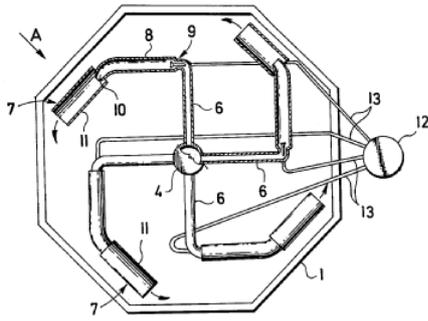
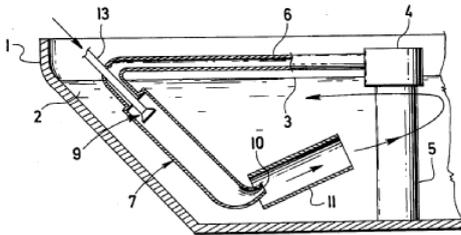


FIG. 1



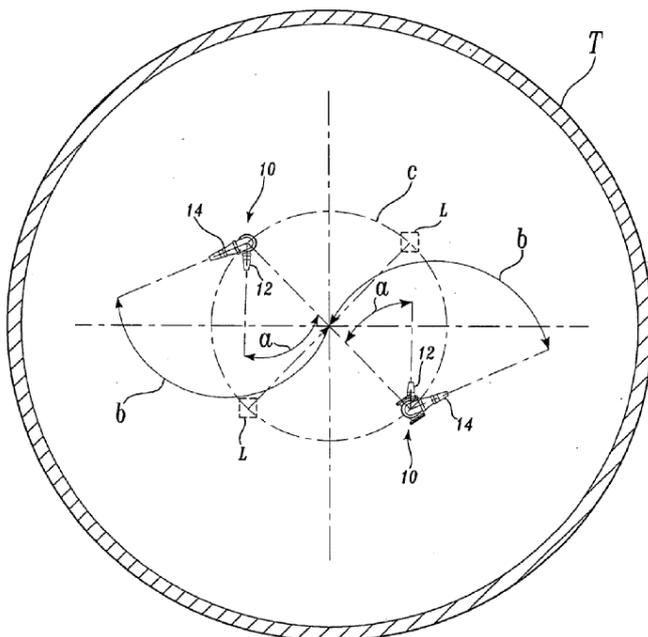
**B01F 5/0218**

[N: the injectors being movable, e.g. rotating]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 5/0256

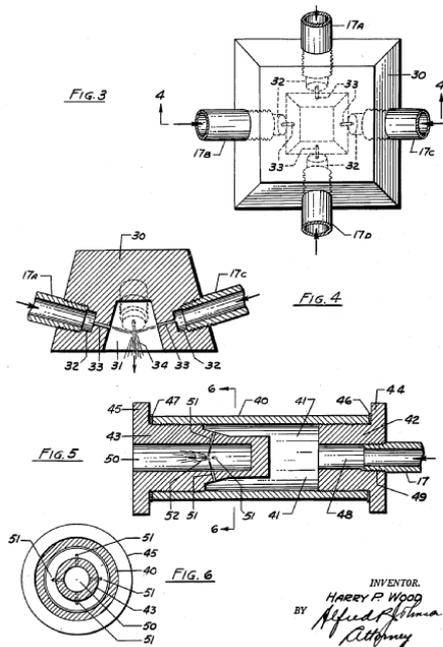
[N: Mixing by intersecting jets (in a stream-impingement mixing head for polymers [B29B 7/76](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

May 20, 1952 H. P. WOOD 2,597,422  
PROCESS OF FORMING DISPERSIONS  
Filed Sept. 11, 1948 2 SHEETS—SHEET 2



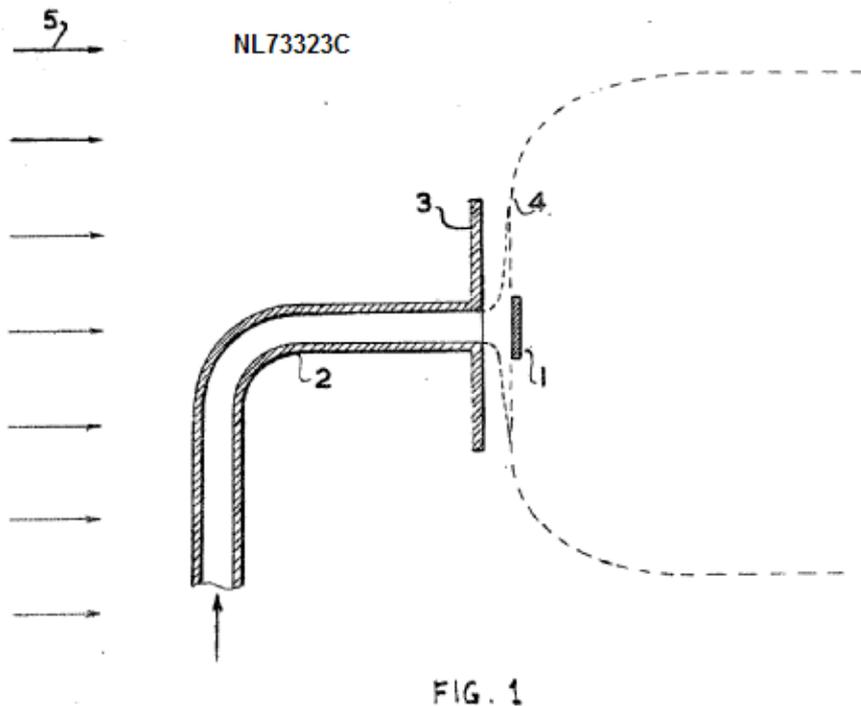
## B01F 5/0268

[N: Mixing by jets impinging against a collision plate]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 5/04

Injector mixers, [N: i.e. one or more components being added to a flowing main component ([B01F 5/0057](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

The mixing of components in which a component is added to another component constituting the main component.

### References relevant to classification in this group

*This subclass/group does not cover:*

Mixing by creating a vortex flow	<a href="#">B01F 5/0057</a>
----------------------------------	-----------------------------

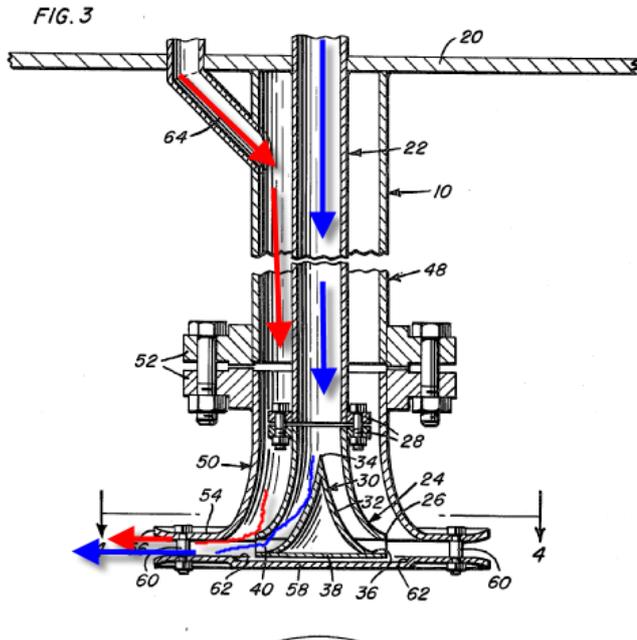
## B01F 5/0401

[N: the additional component being axially fed and radially discharged through a circumferential outlet]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### B01F 5/0415

[N: with additional mixing means other than injector mixers, e.g. screens, baffles or rotating elements]

#### Special rules of classification within this group

The additional mixing means (located either before or after the venturi device) is to be accordingly classified.

### B01F 5/0451

[N: with additional mixing means other than injector mixers, e.g. screens, baffles or rotating elements]

#### Special rules of classification within this group

The additional mixing means (located either before or after the injection device) is to be accordingly classified.

### B01F 5/0473

[N: with additional mixing means other than injector mixers]

#### Special rules of classification within this group

The additional mixing means (located either before or after the injection

device) is to be accordingly classified.

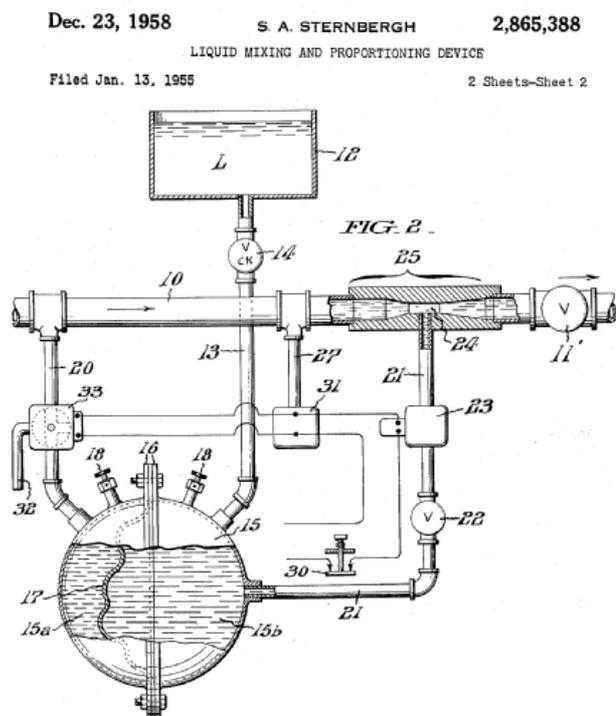
## B01F 5/0495

[N: a difference of pressure at different points of the conduit provoking introduction of the additional component into the main component ([B01F 5/0496](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this group

*This subclass/group does not cover:*

Flow mixers having a container for the additional component fixed to the conduit
--

<a href="#">B01F 5/0496</a>
-----------------------------

## B01F 5/0496

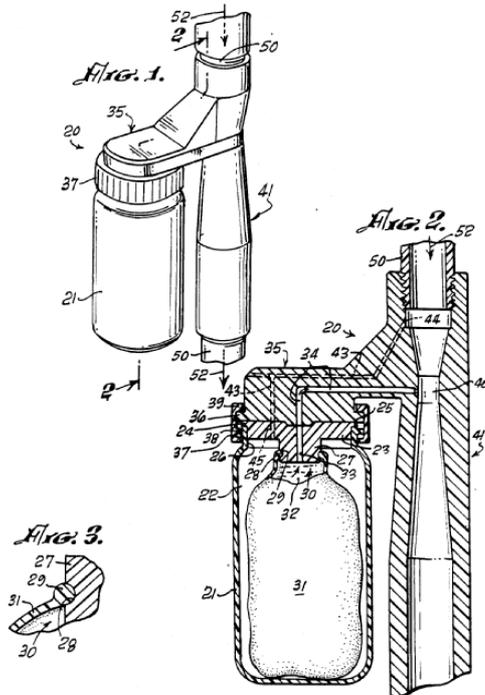
[N: having a container for the additional component fixed to the conduit]

## Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group.

U.S. Patent Dec. 4, 1990 Sheet 1 of 4 4,974,634



## B01F 5/0498

[N: the additional component being added in a by-pass of the main flow ([B01F 5/0496](#), [B01F 5/106](#) take precedence)]

## Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group.

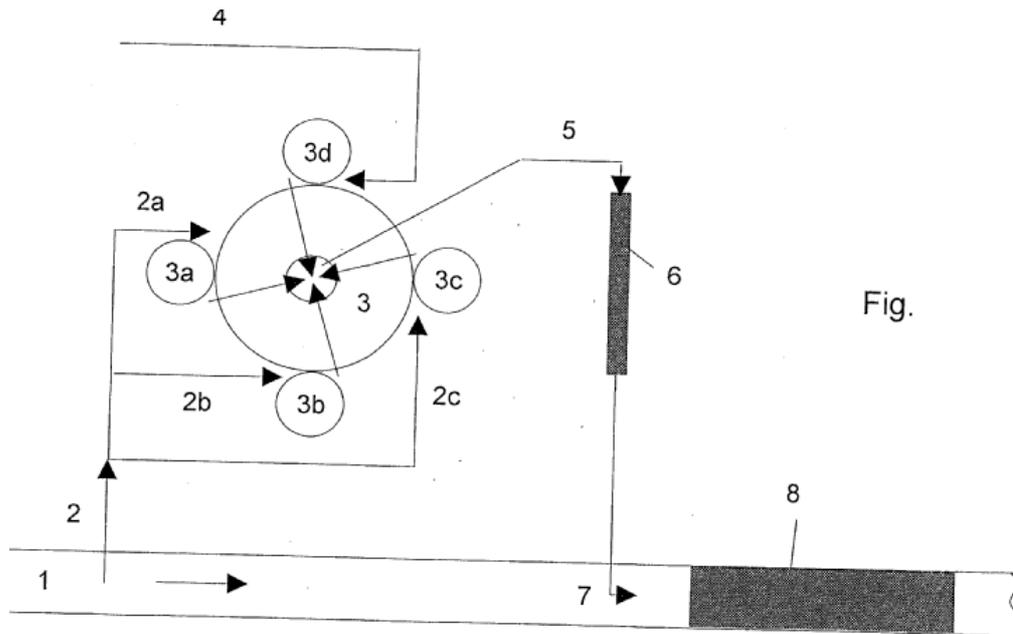


Fig.

Nummer:  
 Int. Cl. 7:  
 Offenlegungstag:  
 DE 198 41 376 A1  
 B 29 B 7/88  
 16. März 2000

## References relevant to classification in this group

*This subclass/group does not cover:*

having a container for the additional component fixed to the conduit	<a href="#">B01F 5/0496</a>
the mixture being discharged from and reintroduced into a receptacle through a recirculation tube into which an additional component is introduced	<a href="#">B01F 5/106</a>

## B01F 5/06

Mixers in which the components are pressed together through slits, orifices, or screens; [N: Static mixers; Mixers of the fractal type] ([N: [B01F 7/164](#), [B01F 7/225](#) take precedence;] turbo-mixers [B01F 5/16](#); colloid-mills [B02C](#); mixing valves [F16K 11/00](#))

## Definition statement

*This subclass/group covers:*

The homogenization of a stream composed by two or more components or the homogenization of the properties of a stream formed by a single component but with non-homogeneous conditions (e.g. layers with different temperature).

The different components are already in contact, the mixing elements being directed to homogenize the stream.

## **B01F 5/0602**

**[N: Static mixers, i.e. mixers in which the mixing is effected by moving the components jointly in changing directions, e.g. in tubes provided with baffles or obstructions ([B01F 5/0661](#), [B01F 5/0682](#) take precedence)]**

### **Definition statement**

*This subclass/group covers:*

The mixing of components by change of direction, splitting-recombining of the stream, etc. wherein the shear introduced in the stream is negligible (i.e. the mixing is not based on high shear effect).

### **References relevant to classification in this group**

*This subclass/group does not cover:*

Mixers in which the components are pressed through slits while introducing shear,	<a href="#">B01F 5/0661</a> ,
Mixers in which the components are pressed together through screens, plates provided with orifices, foam-like inserts, or through a bed of loose bodies, e.g. beads	<a href="#">B01F 5/0682</a>

## **B01F 5/0603**

**[N: the mixture or the components moving in an irregular path, e.g. radially ([B01F 5/0646](#) takes precedence)]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

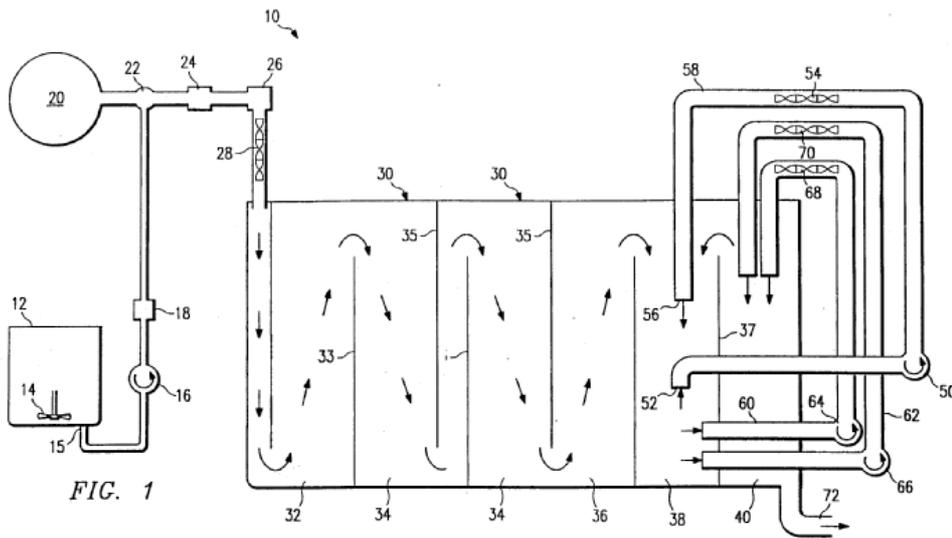


FIG. 1

**B01F 5/0604**

[N: the mixer being composed of stracked plates between which the material is moving, e.g. the plates being provided with grooves or orifices]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

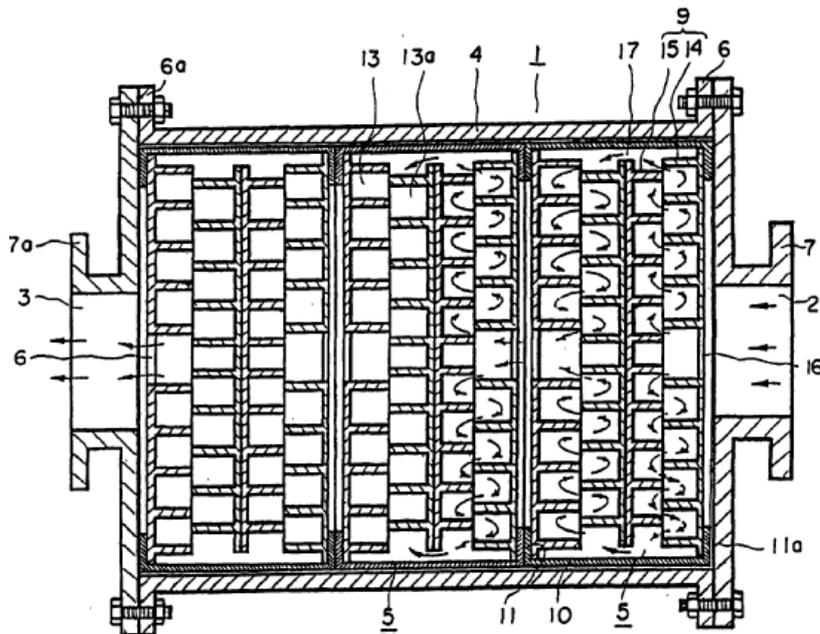


Fig. 1

EP 1 004 351 A1

## B01F 5/061

[N: Straight mixing tubes, e.g. with smooth walls, having baffles or obstructions therein without substantial pressure drop; Baffles therefor (for falling-particle mixers [B01F 5/246](#))]

### Definition statement

*This subclass/group covers:*

Mixers constituted by baffle elements located inside a tube.

## B01F 5/0611

[N: the baffles being adjustable]

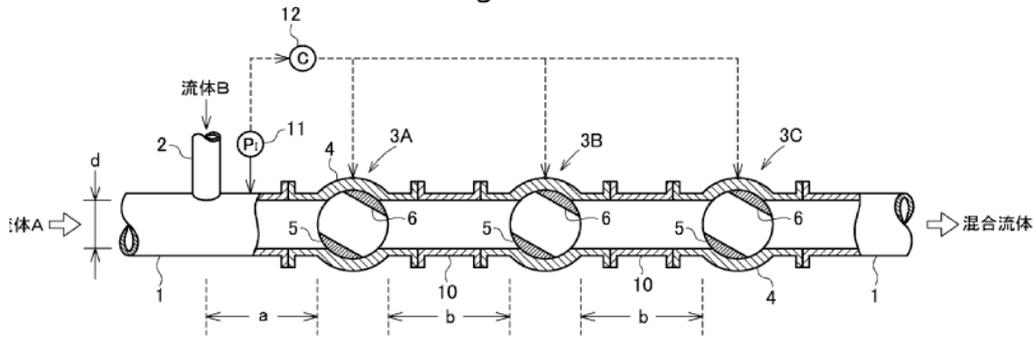
### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group

With active means for adjusting the position of the baffles:

Fig.4



With passive means

With passive means for adjusting the position of the baffles:

DE 10 2009 029 420 A1 2011.03.24

Anhängende Zeichnungen

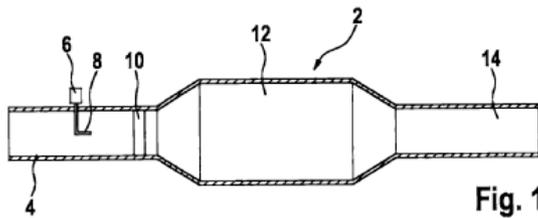


Fig. 1

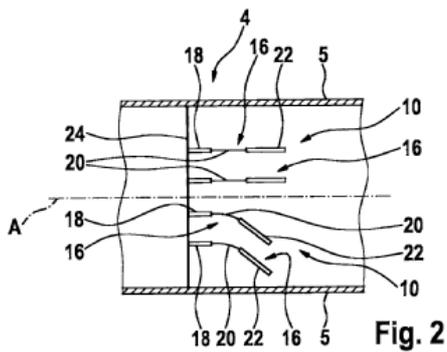


Fig. 2

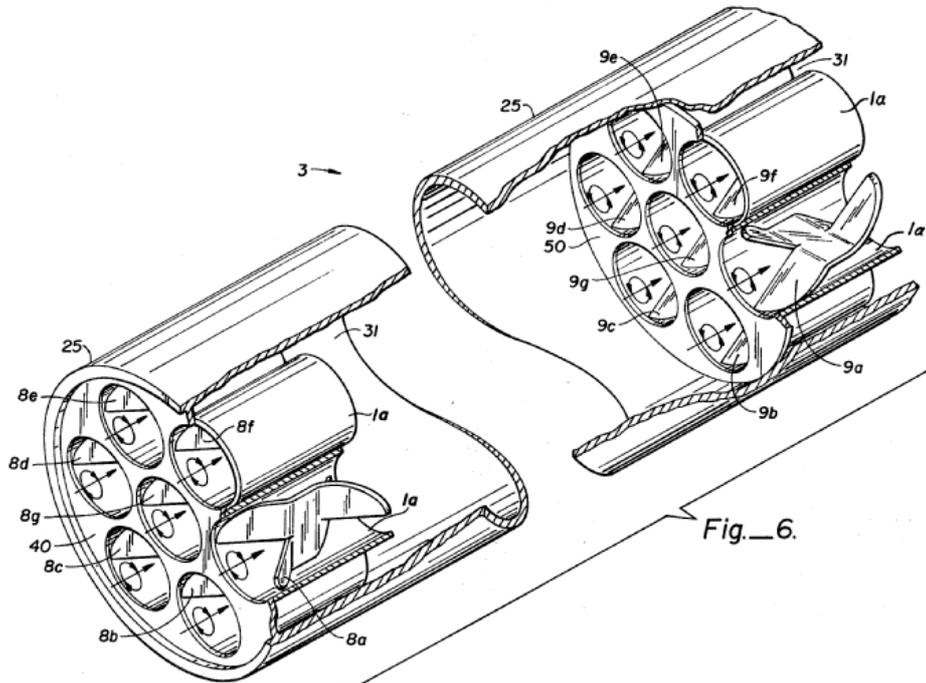
## B01F 5/0613

[N: comprising a plurality of stacked ducts having their axes parallel to the tube axis]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## **B01F 5/0614**

**[N: the baffles being helical elements]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

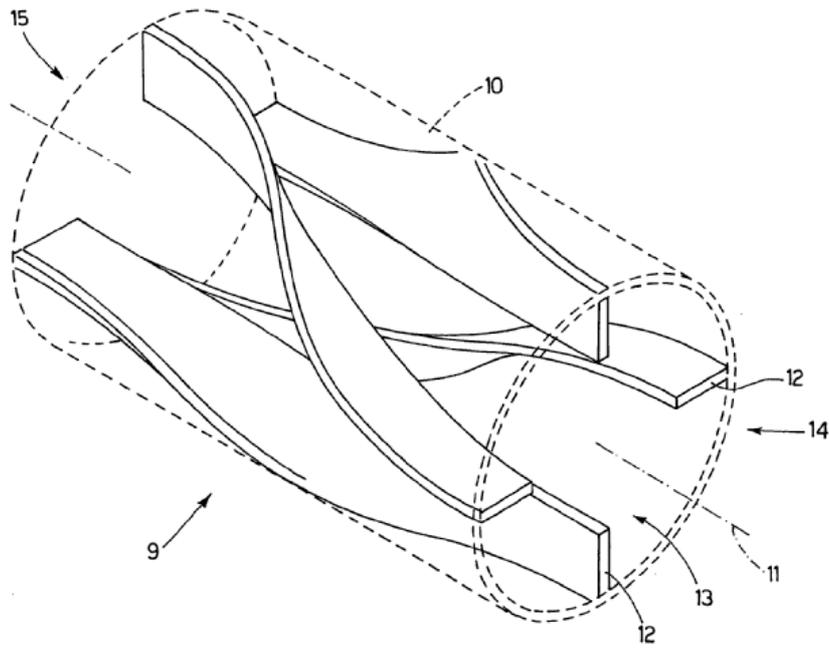


Fig.3

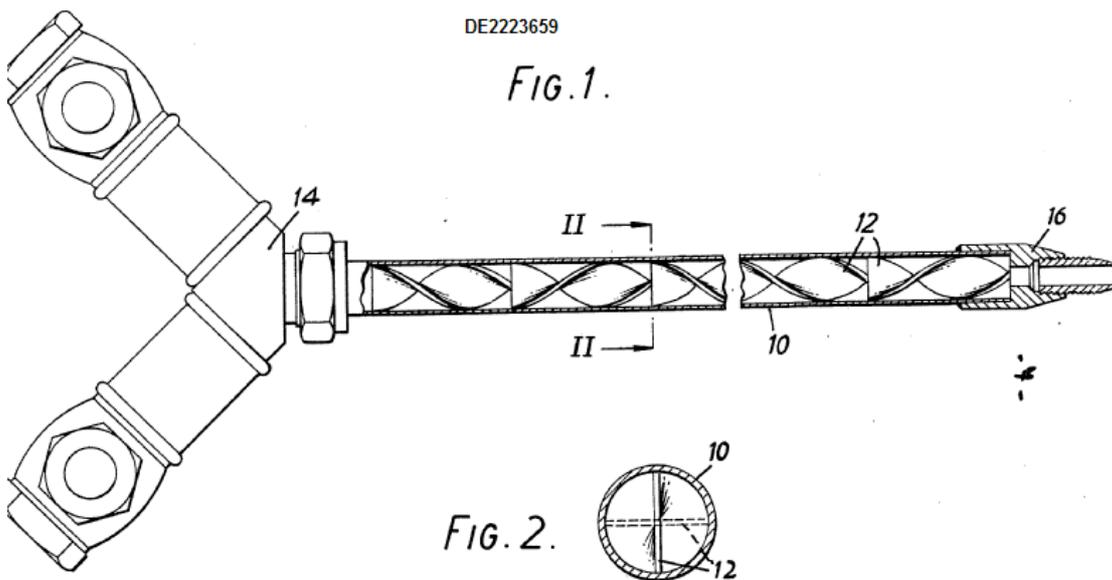
### B01F 5/0615

[N: composed of consecutive sections of helical formed elements]

#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



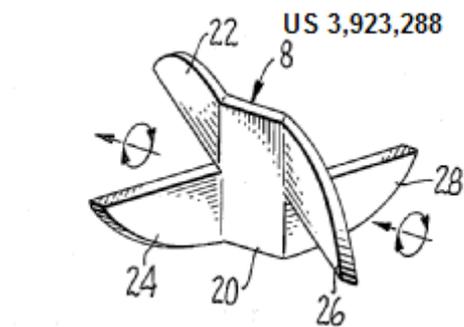
## B01F 5/0616

[N: the baffles being made by deforming flat pieces of material, e.g. by bonding , folding, deep drawing ([B01F 5/0614](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

the baffles being helical elements	<a href="#">B01F 5/0614</a>
------------------------------------	-----------------------------

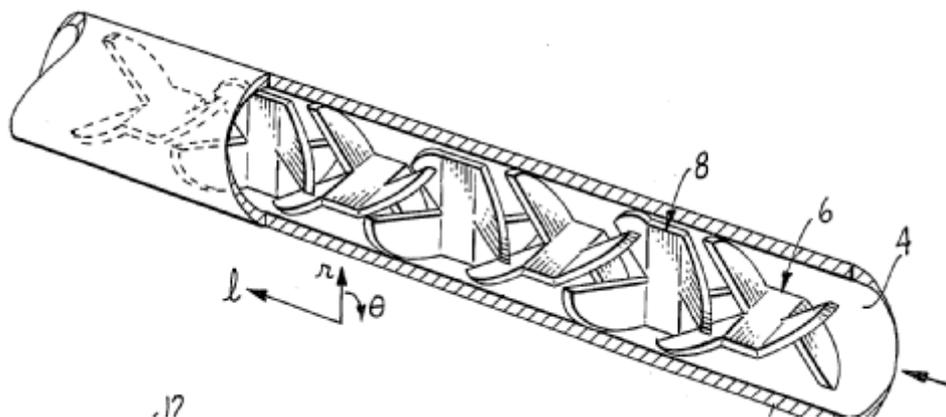
## B01F 5/0617

[N: composed of consecutive sections of deformed flat pieces of material]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



**B01F 5/0618**

[N: the baffles being flat pieces of material, e.g. intermeshing, fixed to the wall, fixed on a central rod]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

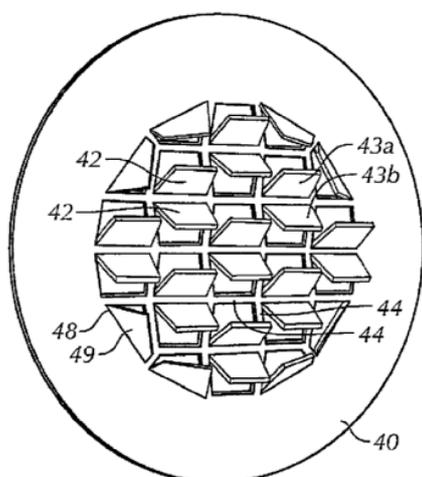


FIG. 4A

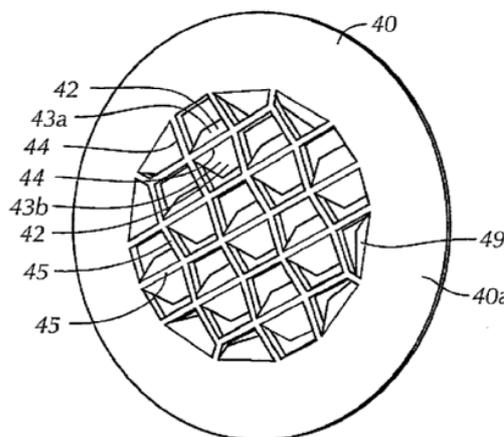


FIG. 4B

## B01F 5/0619

[N: composed of consecutive sections of flat pieces of material]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

WO 2010/066457

PCT/EP2009/008923

1/18

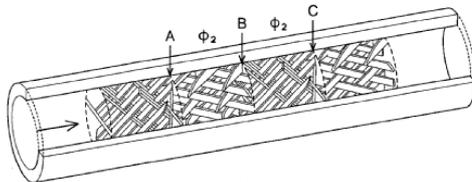
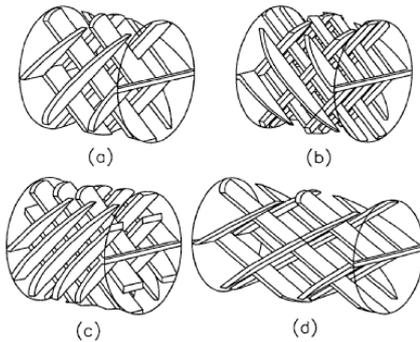


Fig. 1



## B01F 5/064

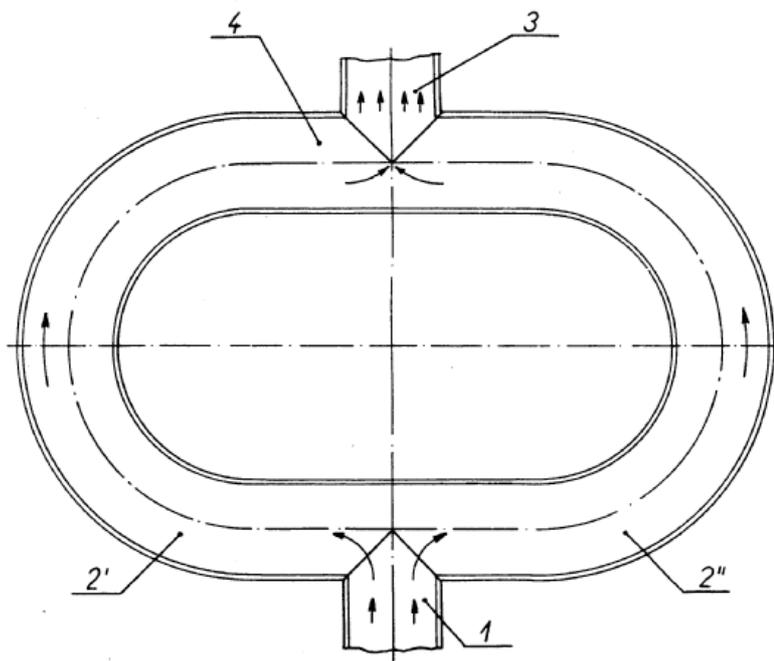
[N: with means for dividing a flow of material into separate subflows and for repositioning and recombining these subflows; Cross-mixing, e.g. conducting the outer layer of the material nearer to the axis of the tube or vice-versa ([B01F 5/0496](#) takes precedence; using baffles [B01F 5/061](#), for falling particle mixers [B01F 5/246](#))]

### Definition statement

*This subclass/group covers:*

Mixers in which a stream comprising two or more components is subdivided in two or more substreams, said substreams being e.g. reoriented and the substreams are recombined.

Example:



- 11 -  
 2740765  
 Nummer:  
 Int. Cl. 2:  
 Anmeldetag:  
 Offenlegungstag:  
 27.10.1966  
 B 01 F 5/00  
 9. September 1977  
 22. März 1979

## References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Flow mixers having a container for the additional component fixed to the conduit	<a href="#">B01F 5/0496</a>
--	-----------------------------

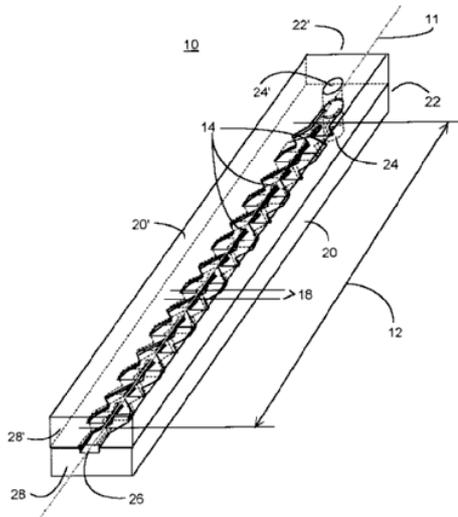
## B01F 5/0641

**[N: the subflows consisting of at least two flat layers which are recombined, e.g. using means having restriction or expansion zones]**

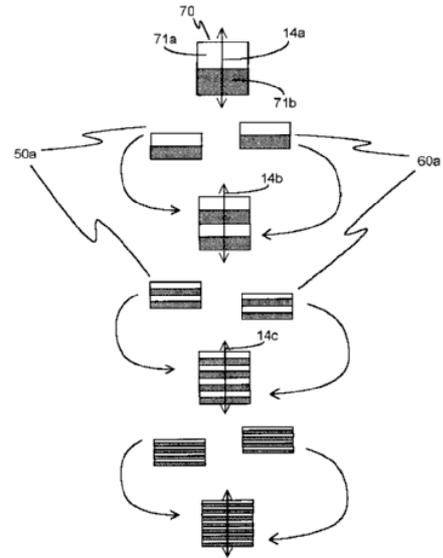
### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



US 5,826,977



## B01F 5/0643

[N: essentially composed of stacks of sheets, e.g. corrugated sheets]

### Definition statement

*This subclass/group covers:*

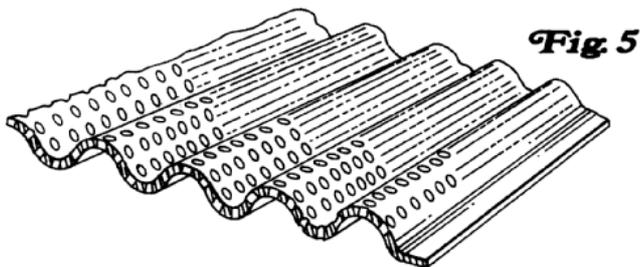
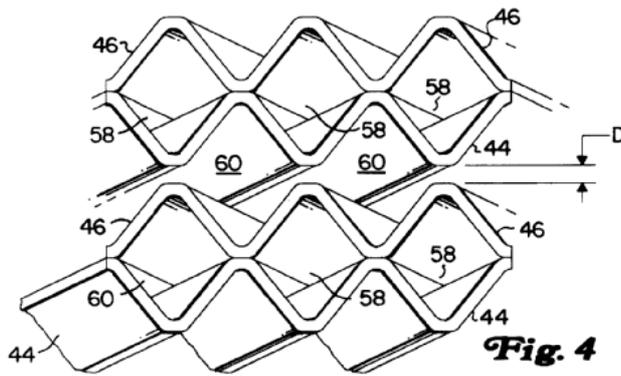
Illustrative example of subject matter classified in this group.

U.S. Patent

Oct. 3, 2000

Sheet 3 of 3

6,127,571



## B01F 5/0644

[N: using elements provided with a plurality of channels or using a plurality of tubes which can either be placed between common spaces or collectors]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

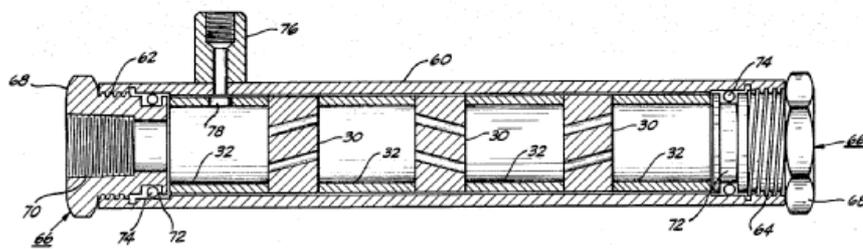


FIG-3

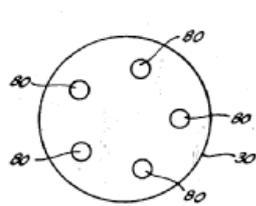


FIG-4

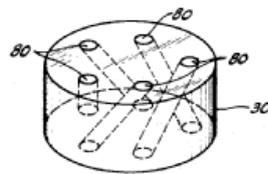


FIG-5

PATENTED JUN 1 1971

SHEET 2 OF 2

3,582,048

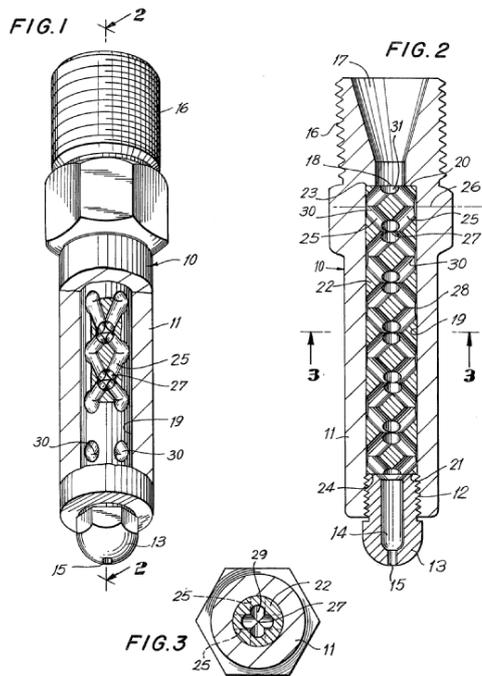
## B01F 5/0645

[N: the channels or tubes crossing each other several times]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 5/0646

[N: Mixers composed of several consecutive mixing tubes; Mixing tubes being deformed or bent, e.g. having varying cross-section or being provided with inwardly extending profiles, e.g. with internal screw-thread profile ([B01F 5/0656](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

Bent tubes or coiled elements:

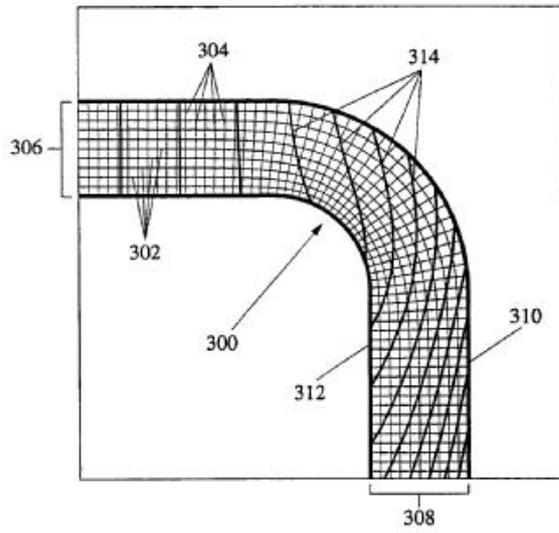
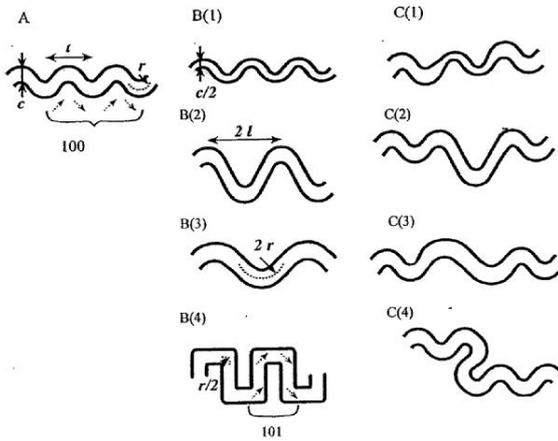
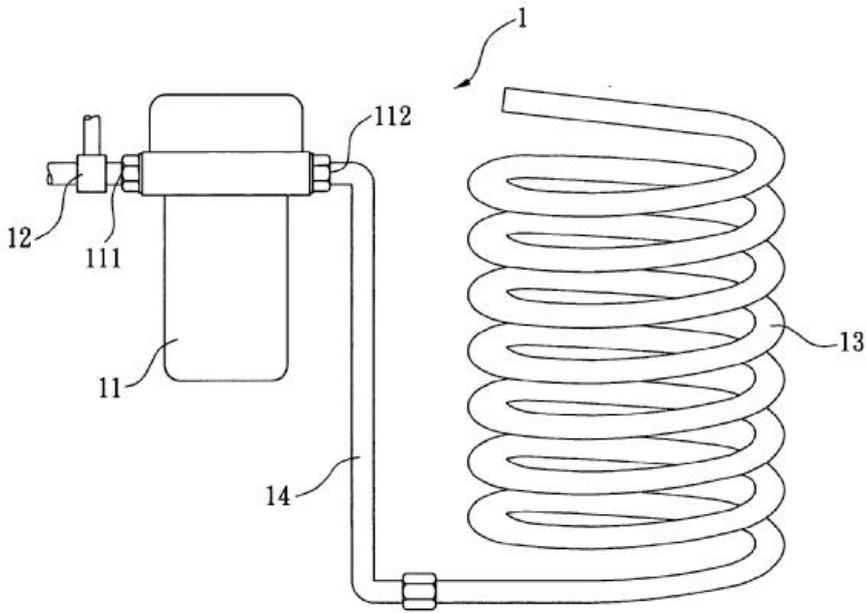
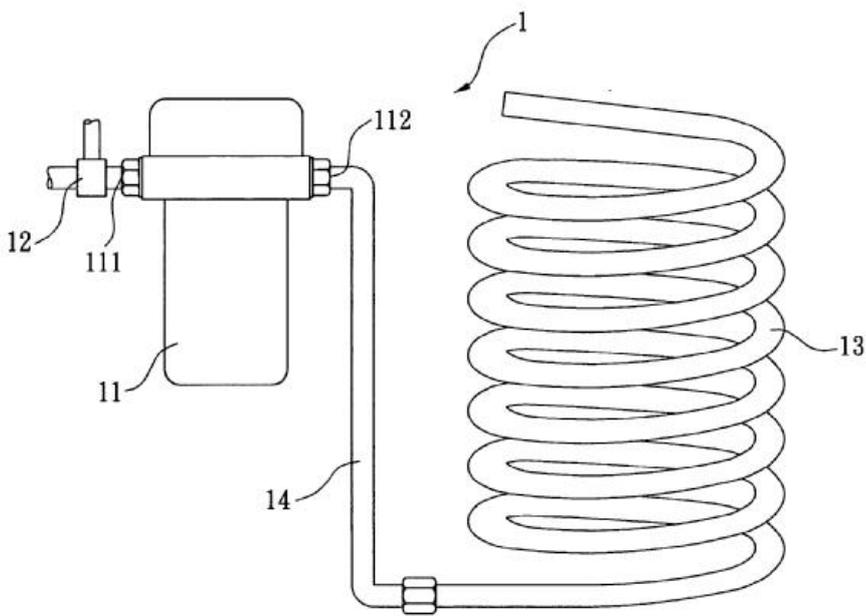


FIG. 3 (PRIOR ART)



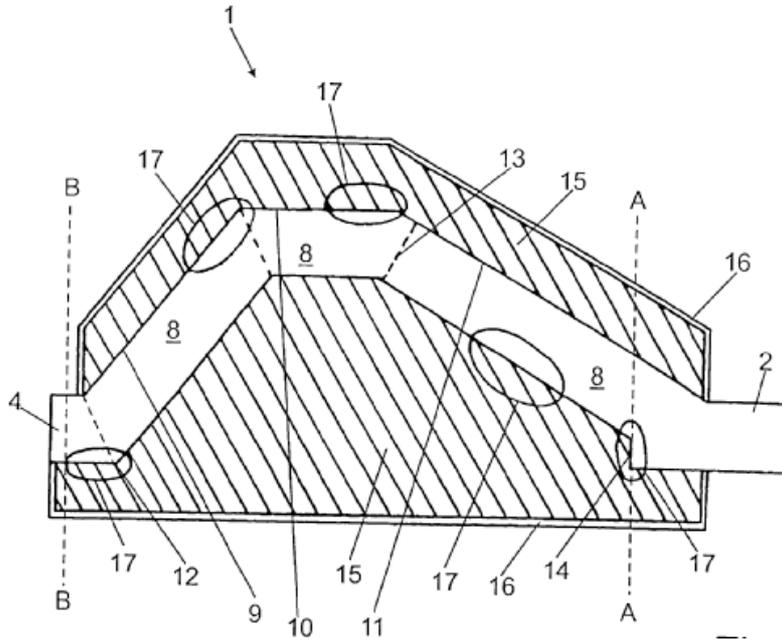


EP 2 103 344 A1



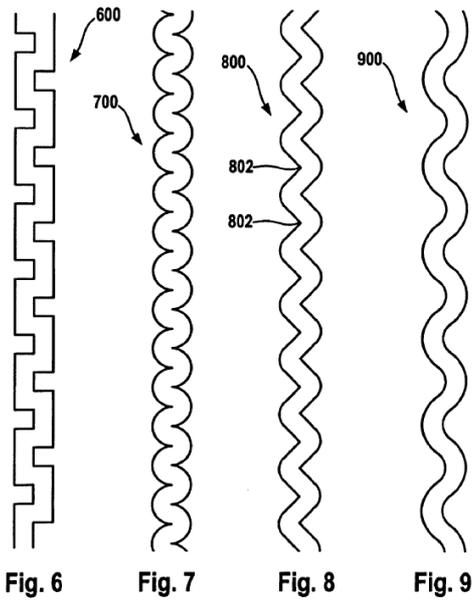
EP 2 103 344 A1

Strong change of direction:

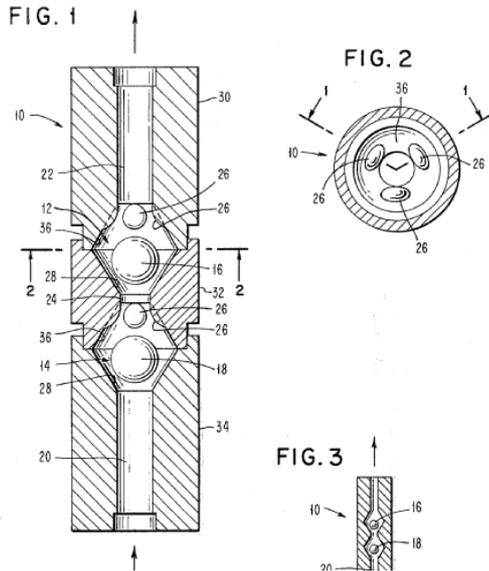


Scallop shape:

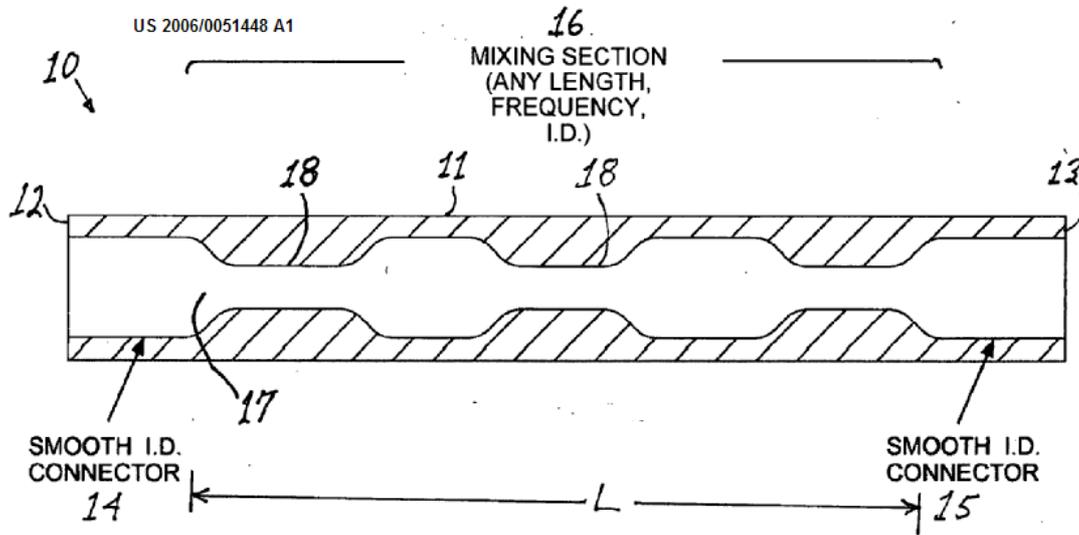
Patent Application Publication Oct. 15, 2009 Sheet 3 of 4 US 2009/0255601 A1



Converging/diverging sections:



Undulating conduit (i.e. a succession of converging-diverging sections):



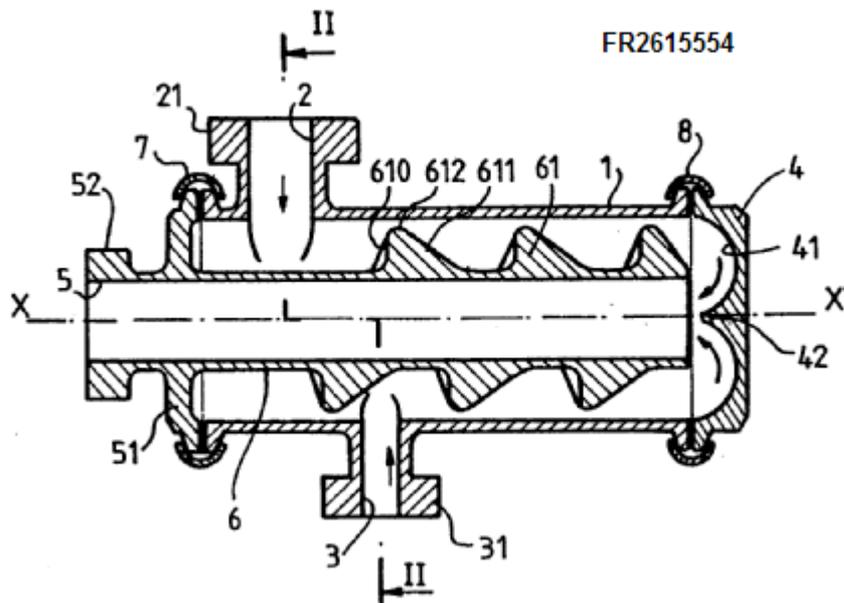
**B01F 5/0656**

[N: Mixing tubes having therein a cylindrical insert provided with grooves, e.g. the tube being provided with inwardly extending profiles or grooves (B01F5/06D4 takes precedence)]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### **B01F 5/0659**

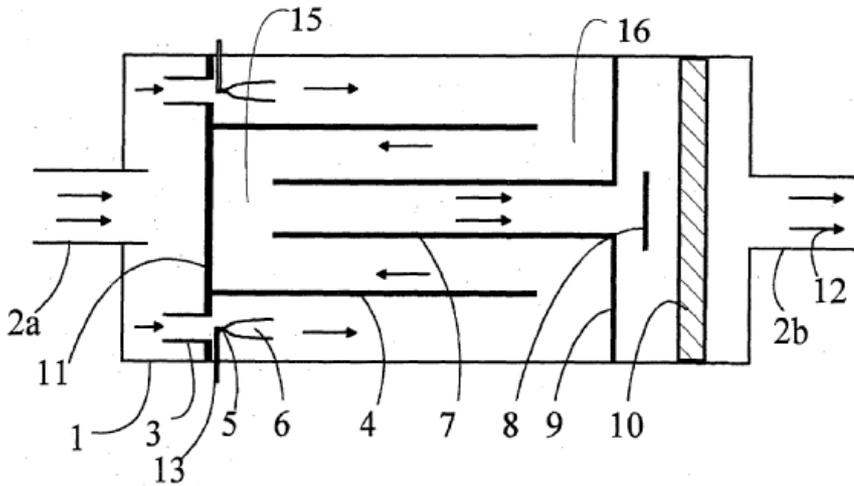
[N: Mixing tubes composed of concentric tubular members (pressing the components through tubular members provided with orifices [B01F 5/0682](#))]

#### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Figur 1



**References relevant to classification in this subclass/group**

*This subclass/group does not cover:*

<p>Mixers in which the components are pressed together through screens, plates provided with orifices, foam-like inserts, or through a bed of loose bodies, e.g. beads</p>	<p><a href="#">B01F 5/0682</a></p>
--	------------------------------------

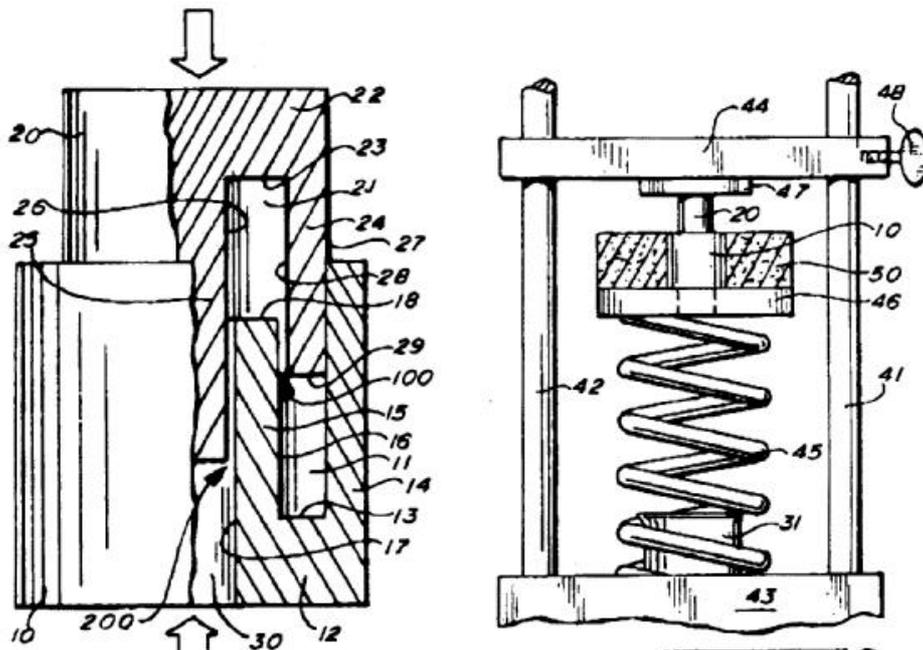
**B01F 5/066**

[N: with movable slits formed between reciprocating surfaces (with movable slits formed between stator-rotor or two rotor systems [B01F 7/0075](#), [B01F 7/0085](#), [B01F 7/1625](#))]

**Definition statement**

*This subclass/group covers:*

The mixing of components wherein the material flows through slits left between two elements which can be reciprocately adjusted. Example:



**B01F 5/0661**

[N: Mixers in which the components are pressed through slits while introducing shear, e.g. the slits being formed by balls and their seats, by the spiro of helical springs ([B01F 7/0075](#) takes precedence)]

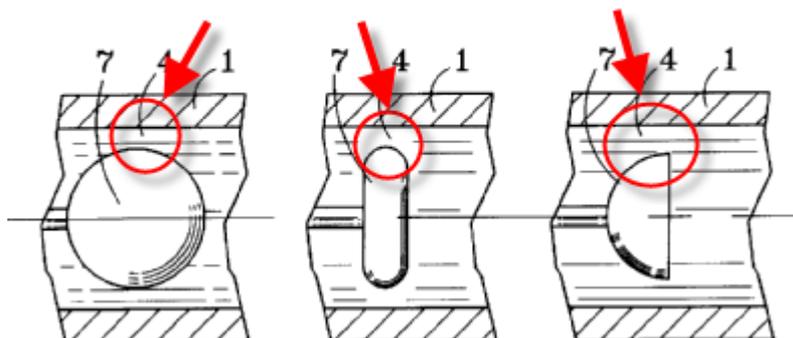
**Definition statement**

*This subclass/group covers:*

The mixing of components wherein the materials are flown through slits with the introduction of high shear forces.

Example:

US 5,937,906



## References relevant to classification in this subclass/group

*This subclass/group does not cover:*

the mixer being composed of a stator-rotor system with movable slits between surfaces facing each other

[B01F 7/0075](#)

## B01F 5/0663

[N: the slits being formed between opposed planar surfaces, e.g. pushed again each other by springs]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

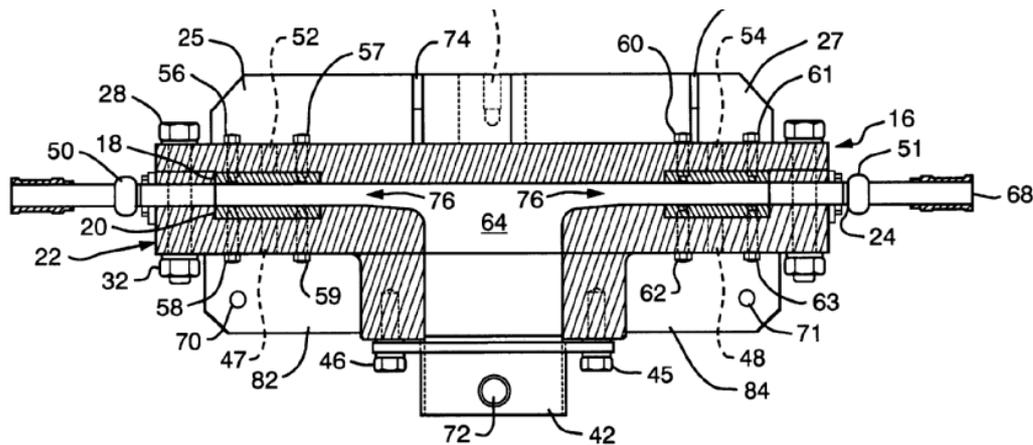


FIG. 3

May 8, 2001

Sheet 3 of 11

US 6,227,696 B1

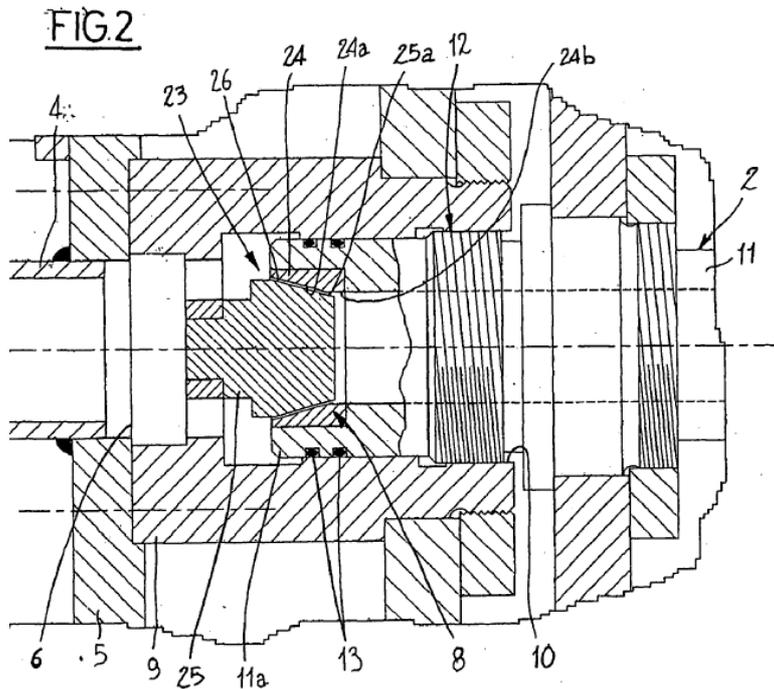
## B01F 5/0665

[N: the slits being formed between opposed conical or cylindrical surfaces]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 5/0682

**[N: Mixers in which the components are pressed together through screens, plates provided with orifices, foam-like inserts, or through a bed of loose bodies, e.g. beads ([B01F 7/0075](#) takes precedence)]**

### Definition statement

*This subclass/group covers:*

The mixing of components by making them flow through orifices, the shear introduced in the stream being relevant for the homogenization process.

Examples:

Plates with orifices:



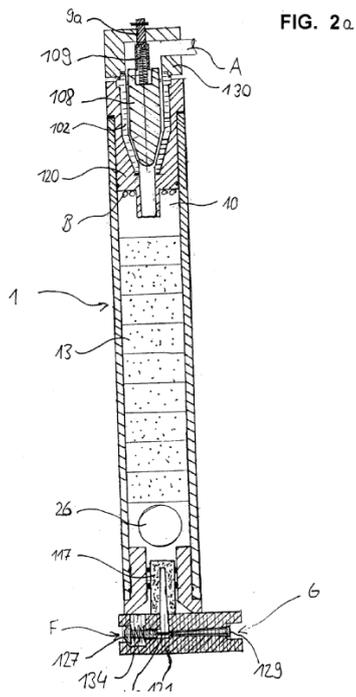
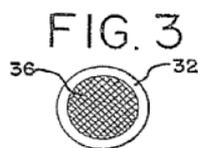
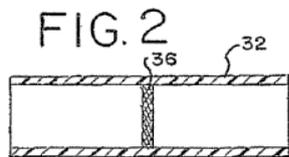
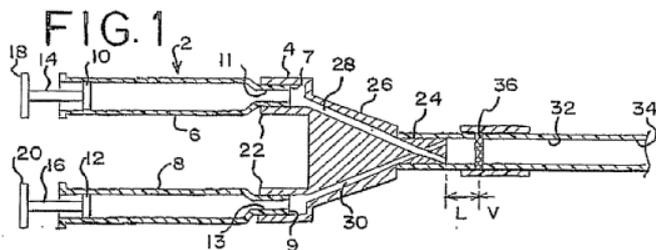


FIG. 2a.

Sieve elements (cylinders or plates):



**References relevant to classification in this subclass/group**

*This subclass/group does not cover:*

the mixer being composed of a	<a href="#">B01F 7/0075</a>
-------------------------------	-----------------------------

stator-rotor system with movable slits between surfaces facing each other	
---	--

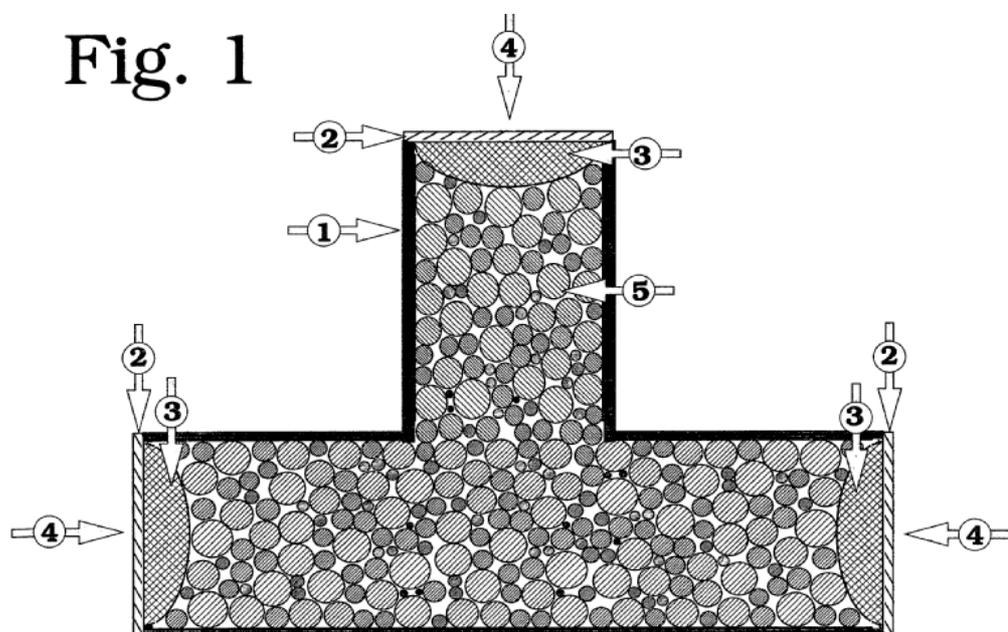
## B01F 5/0686

[N: the components being pressed through foam-like inserts or through a bed of loose bodies, e.g. balls ([B01F 5/0683](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



DE 10 2005 019 410 A1 2006.10.26  
Anhängende Zeichnungen

### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Flow mixers characterised by the means for moving the components or the mixture	<a href="#">B01F 5/0683</a>
---	-----------------------------

## B01F 5/08

Homogenizing or emulsifying nozzles

## B01F 5/10

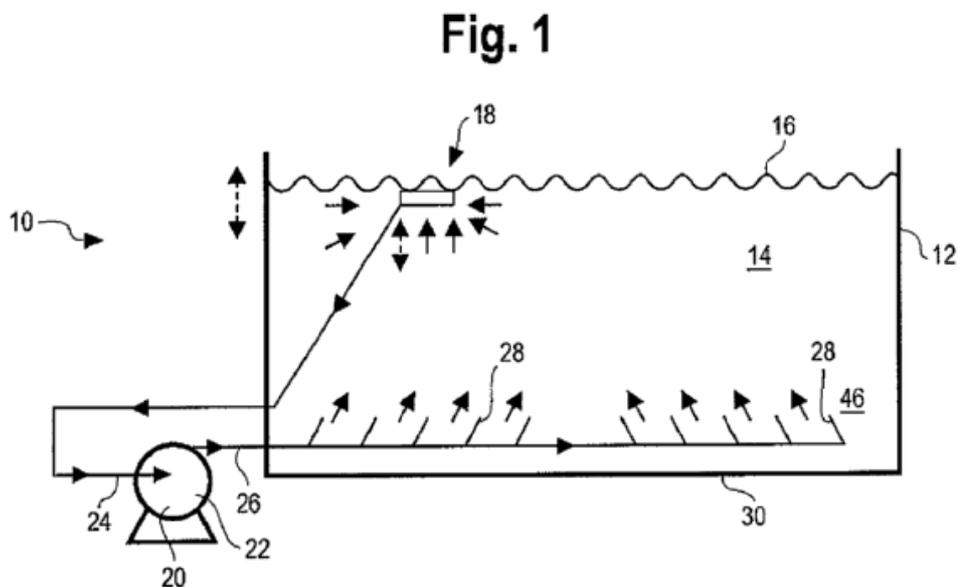
Circulation mixers, [N: e.g. at least part of the mixture being discharged from, and reintroduced into, a receptacle, e.g. with rotary stirrer ([B01F 5/02](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication    Apr. 1, 2010    Sheet 1 of 8    US 2010/0080077 A1



### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Jet mixers	<a href="#">B01F 5/02</a>
------------	---------------------------

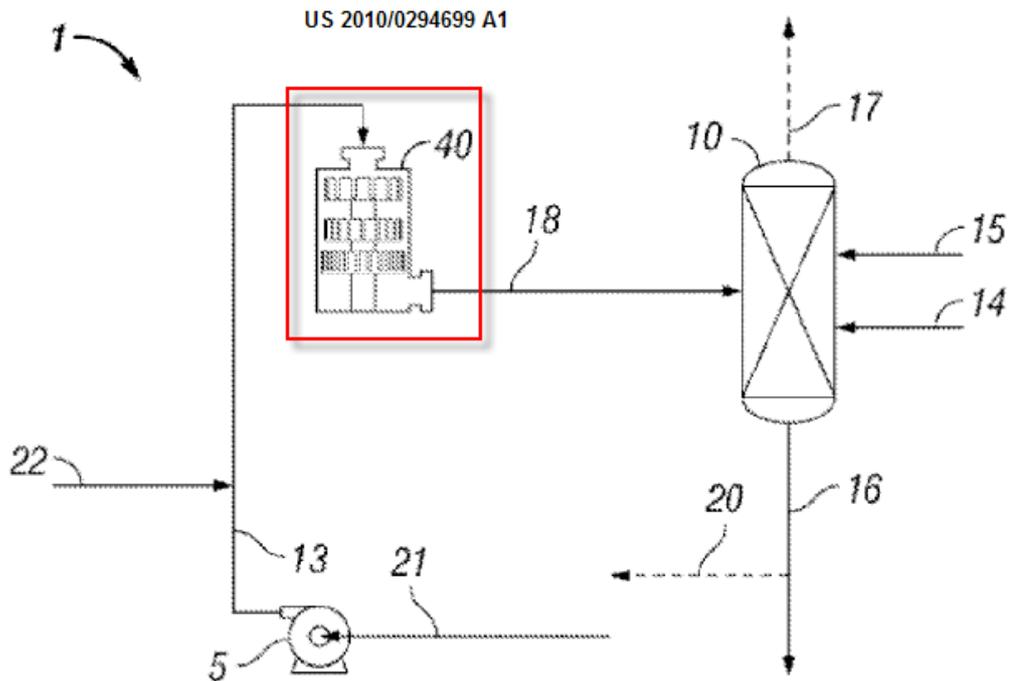
## B01F 5/102

[N: the mixture being circulated during mixing through a set of tubes, e.g. involving gradually introducing a component into a circulating flow]

### Definition statement

*This subclass/group covers:*





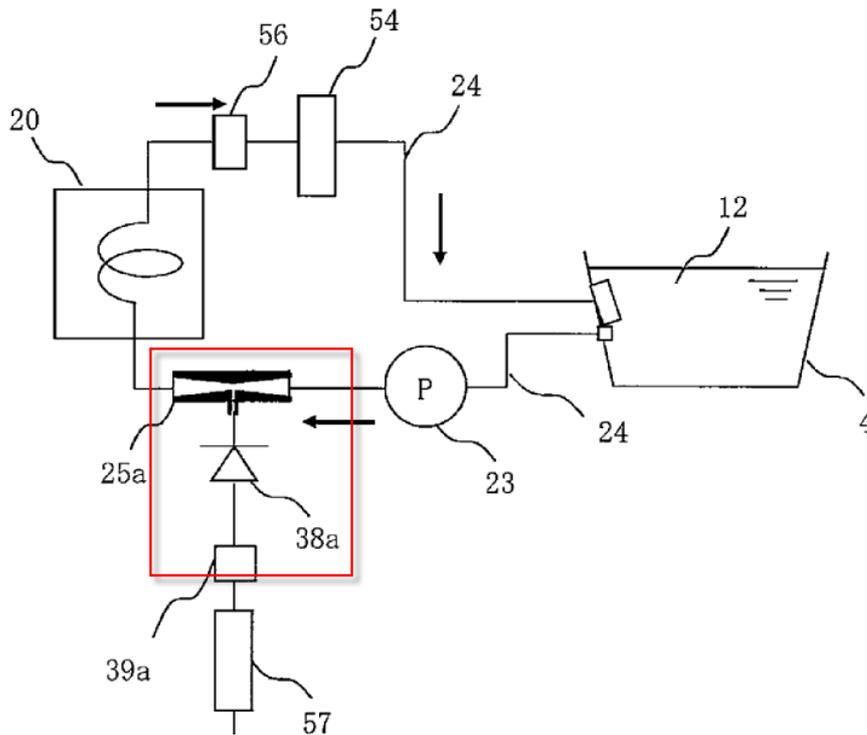
## B01F 5/106

[N: the mixture being discharged from and reintroduced into a receptacle through a recirculation tube into which an additional component is introduced]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



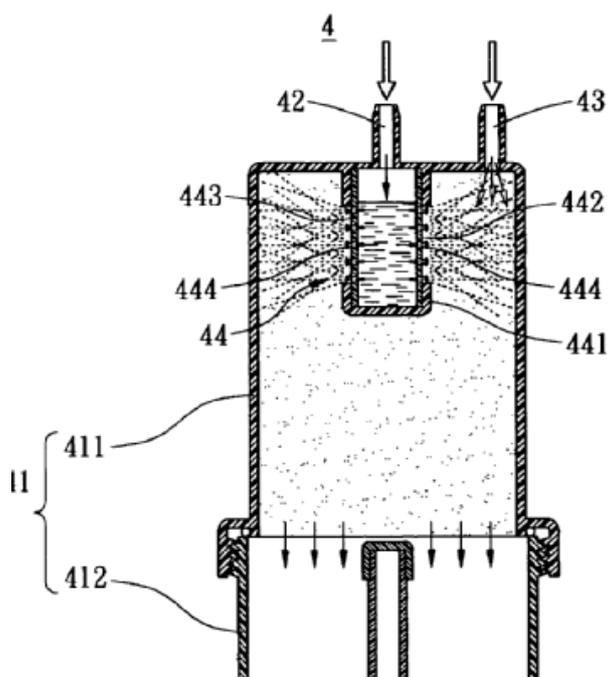
## B01F 5/18

**Spray-mixers; [N: Mixing intersecting sheets of material, e.g. conical liquid sheets ([B01F 3/0473](#), [B01F 7/022](#), [B01F 9/025](#) take precedence)]**

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Surface aerating	<a href="#">B01F 3/0473</a>
Mixers with rotary stirring devices in fixed receptacles comprising liquid feeding	<a href="#">B01F 7/022</a>
Mixers with rotating receptacles comprising liquid spraying devices	<a href="#">B01F 9/025</a>

### **B01F 5/20**

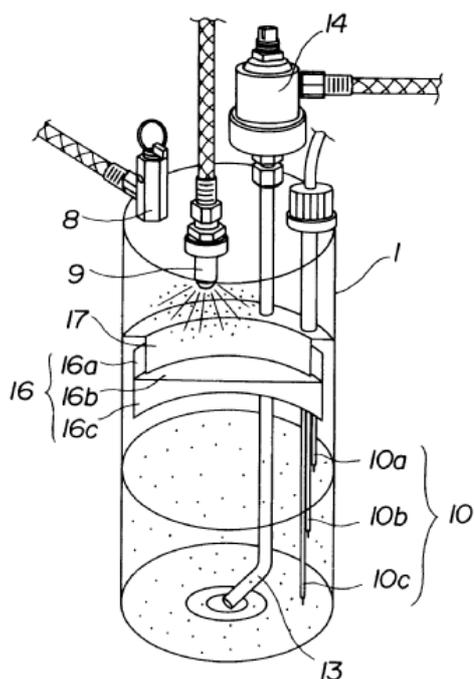
with nozzles [N: ([B01F 3/04049](#) takes precedence; nozzles per se [B05B 1/00](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

EP 0 745 425



## References relevant to classification in this group

*This subclass/group does not cover:*

Mixing using nozzles	<a href="#">B01F 3/04049</a>
----------------------	------------------------------

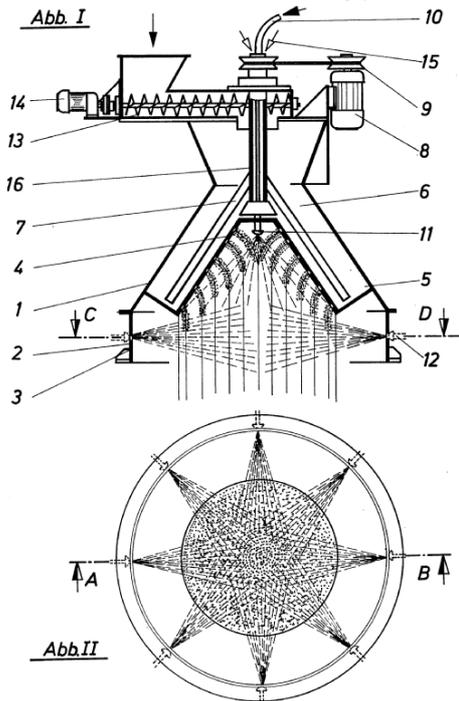
## B01F 5/205

[N: for spraying a fluid on falling particles or on a liquid curtain]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



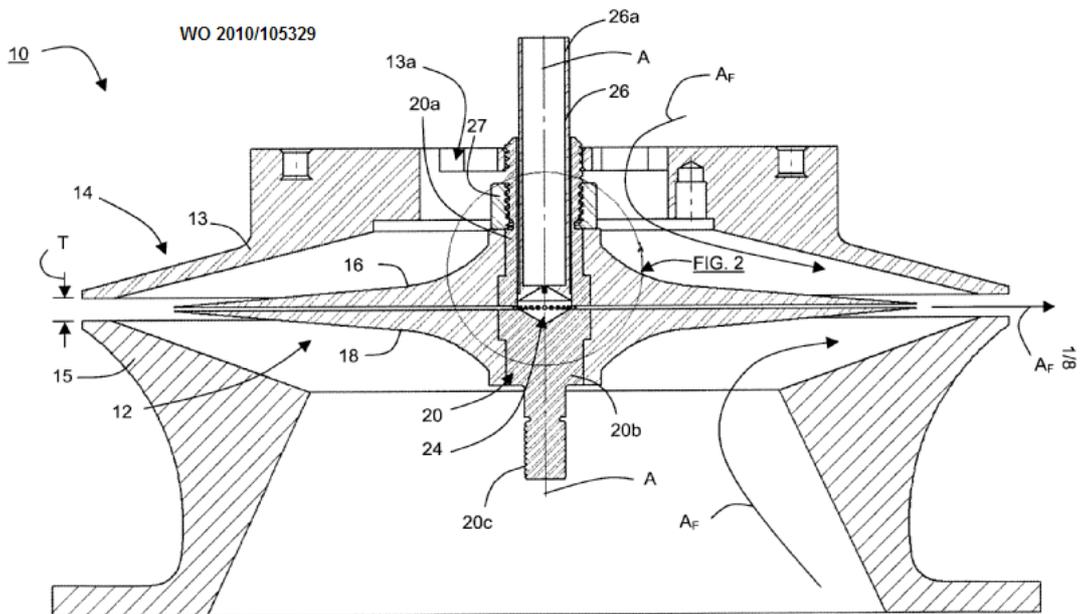
**B01F 5/22**

with rotary [N: parts, e.g.] discs [N: ([B01F 3/04035](#), [B01F 7/0075](#) take precedence)]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



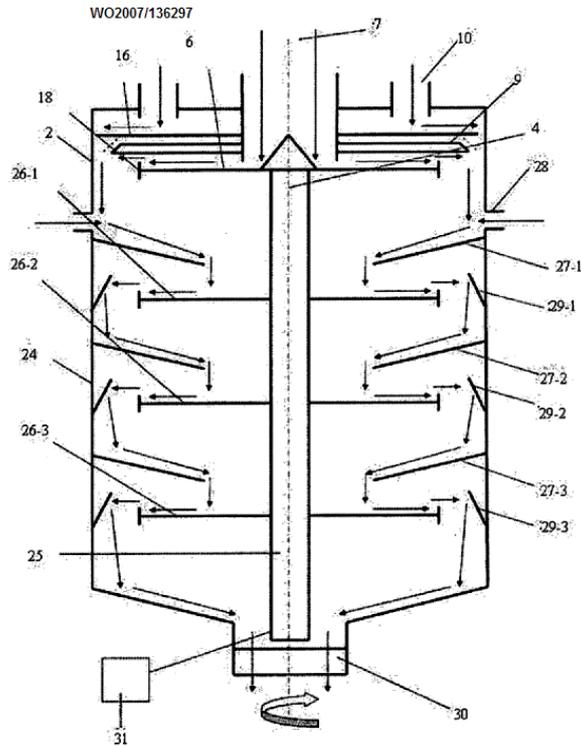


being guided, by means provided on the surrounding casing, on top of the next lower disc]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



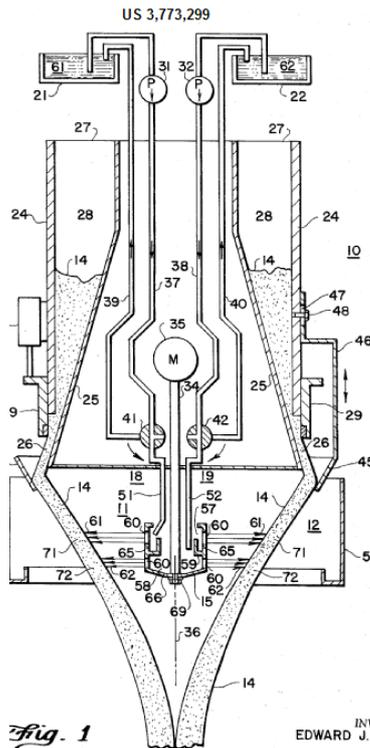
### B01F 5/225

[N: for spraying a liquid on falling particles or on a liquid curtain ([B01F 5/223](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Flow mixers with repeated action	<a href="#">B01F 5/223</a>
----------------------------------	----------------------------

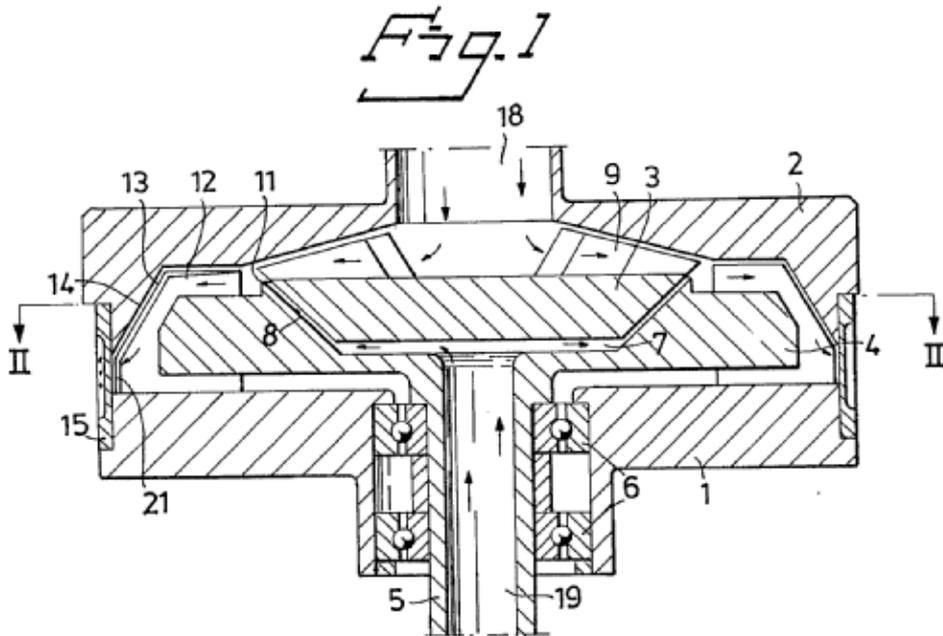
## B01F 5/226

[N: the material being fed on both sides of a part rotating about a vertical axis]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



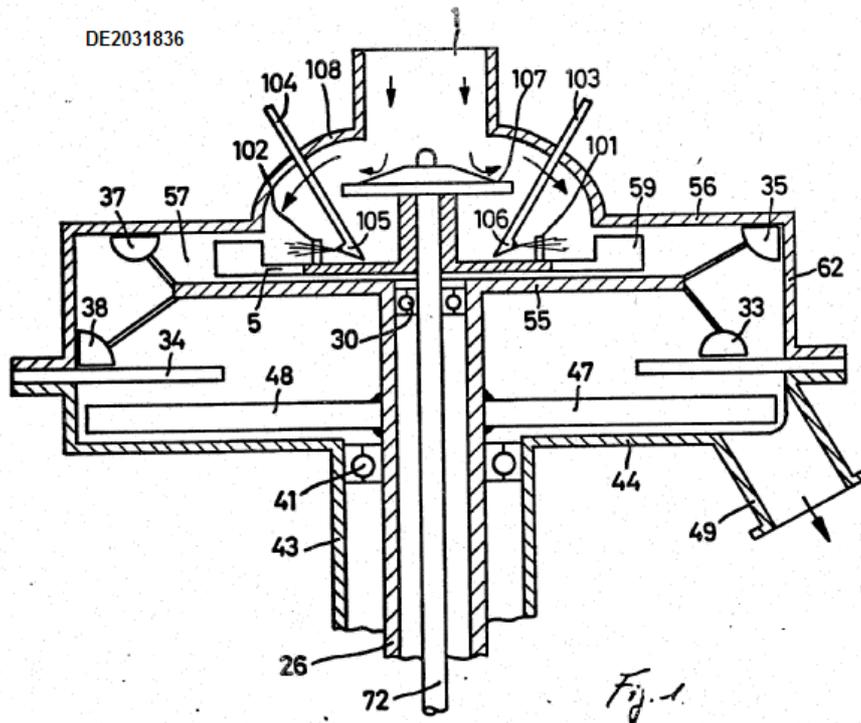
## B01F 5/228

[N: the rotating part being composed of at least two cooperating members rotating independently about the same vertical axis]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 5/241

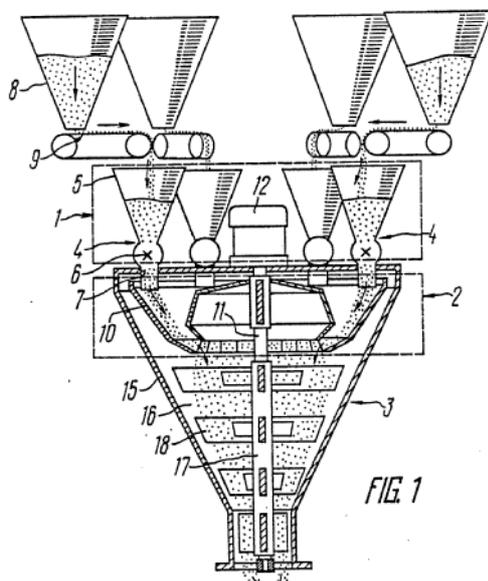
[N: Particle mixers uniting flows of material taken from different parts of a receptacle or from a set of receptacles (for liquids [B01F 3/0869](#); devices for emptying containers from the top with vertical passage located inside the containers [B65G 65/365](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

1 / 10



**References relevant to classification in this group**

*This subclass/group does not cover:*

For liquids	<a href="#">B01F 3/0869</a>
Devices for emptying containers from the top with vertical passage located inside the containers	<a href="#">B65G 65/365</a>

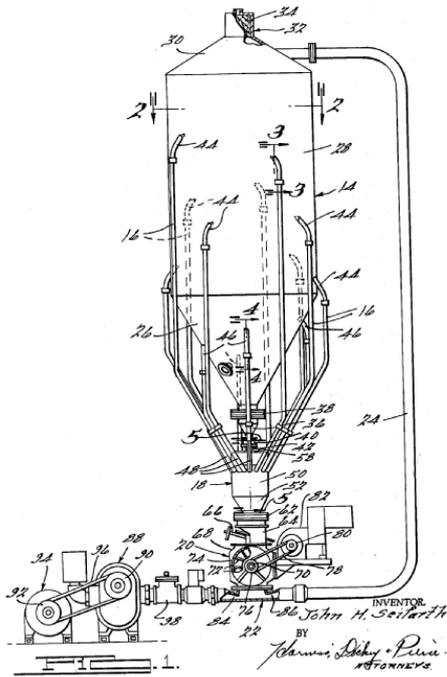
**B01F 5/242**

[N: by means of conduits having inlet openings at different levels]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



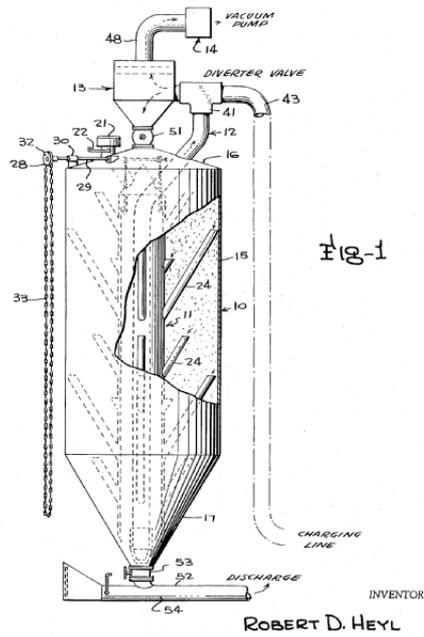
### B01F 5/243

[N: by means of a central conduit or central set of conduits]

#### Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group.



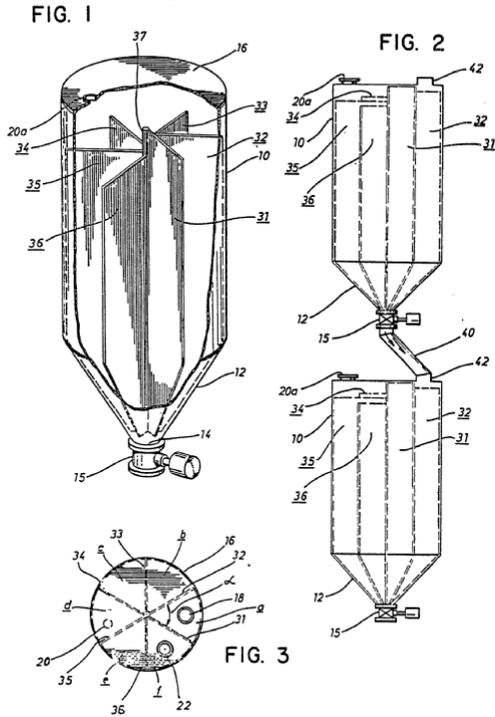
## B01F 5/244

[N: the receptacle being divided into compartments for receiving or storing the different components]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



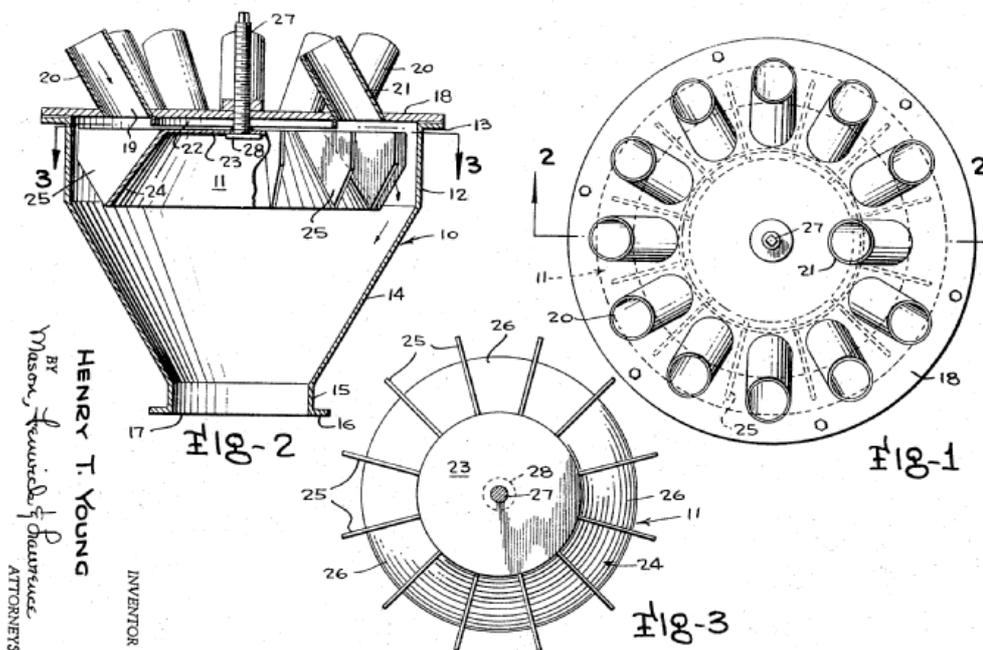
**B01F 5/245**

**[N: Flow collectors therefor]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



HENRY T. YOUNG  
INVENTOR  
BY  
Mason, Fenwick & Shaw  
ATTORNEYS

June 10, 1969  
H. T. YOUNG  
SOLIDS FLOW COLLECTOR  
Filed Dec. 4, 1967

3,448,968

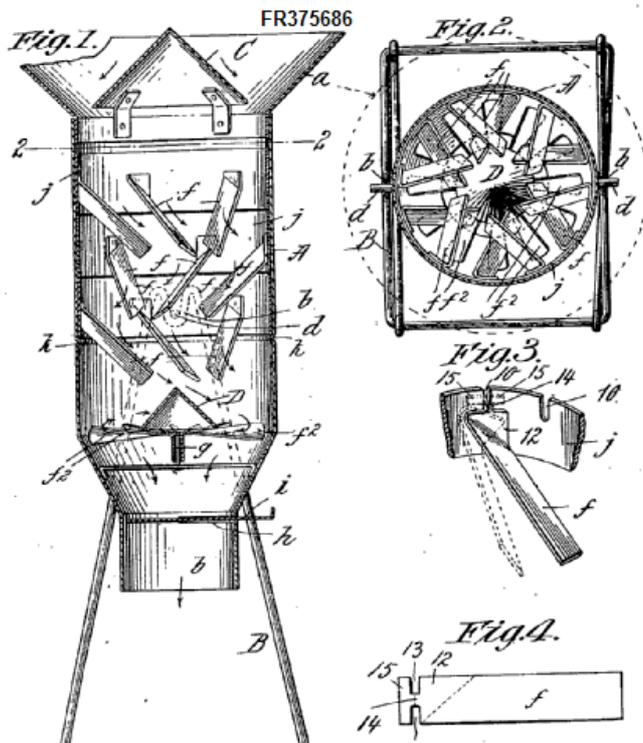
## B01F 5/246

[N: Falling-particle mixers comprising receptacles provided with fixed guiding elements, e.g. baffles, therein;  
Cross-mixers comprising crossing channels for guiding the falling particles]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 5/247

[N: Falling-particle mixers comprising superimposed receptacles, the material flowing from one to the other, e.g. of the sandglass type (for liquids [B01F 3/0869](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Oct. 24, 1967

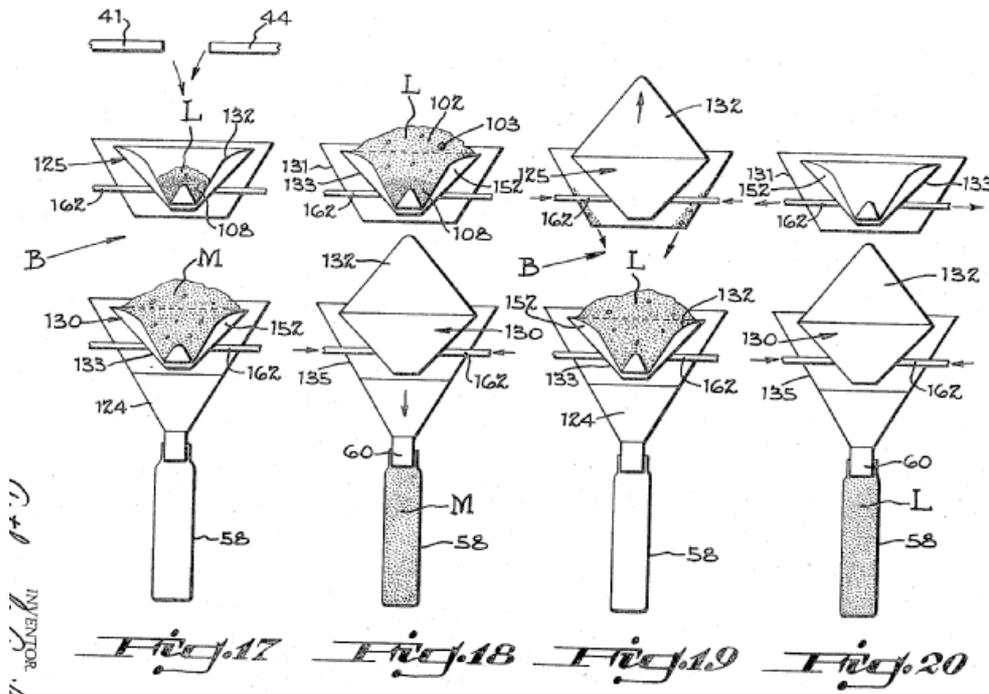
A. C. AVRIL

3,348,818

Filed Feb. 12, 1965

APPARATUS AND METHOD FOR BINDING DRY MATERIALS

15 Sheets-Sheet 12



INVENTOR

### References relevant to classification in this group

This subclass/group does not cover:

For liquids	<a href="#">B01F 3/0869</a>
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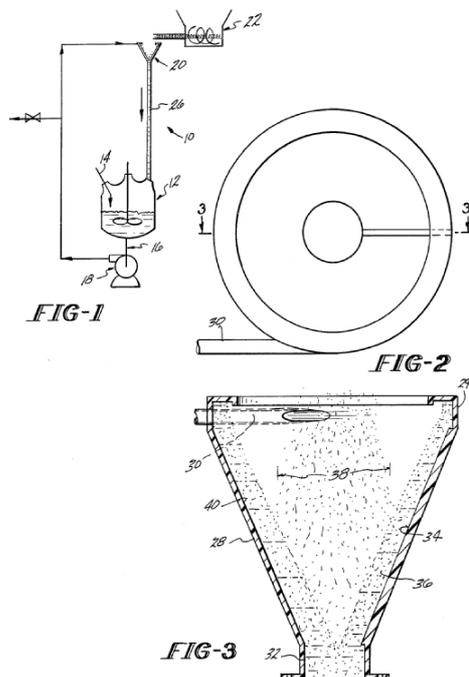
### B01F 5/248

[N: the particles falling on a film flowing along the inner wall of a mixer]

### Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group.



## B01F 5/26

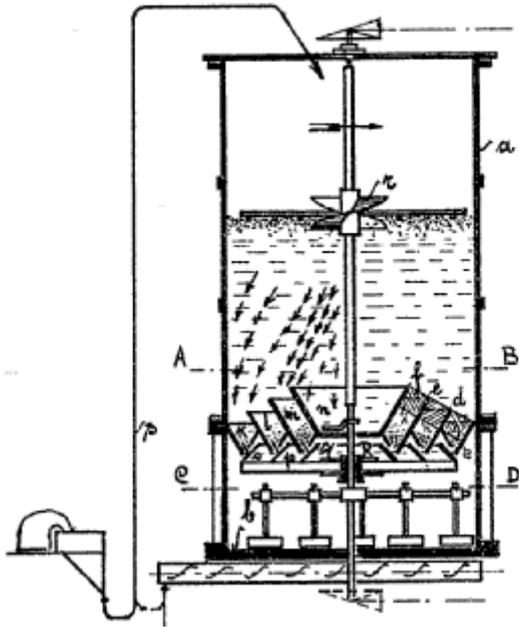
Falling-particle mixers with moving [N: or vibrating] means, e.g. stirrers, for increasing the mixing [N: ([B01F 5/24](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

DE475251



### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Falling-particle mixers, [N: e.g.] with repeated action	<a href="#">B01F 5/24</a>
---	---------------------------

### **B01F 5/265**

using one central conveyor or several separate conveyors, e.g. belt or screw conveyors, vibrating tables, for discharging flows from receptacles, e.g. in layers

### Definition statement

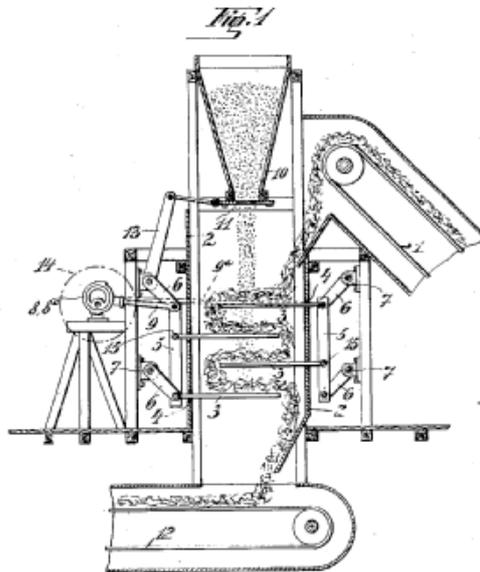
*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Jan. 15, 1929.

1,698,881

K. ERDMANN  
METHOD AND APPARATUS FOR MIXING LONG FIBERED  
MATERIALS WITH POWDERY SUBSTANCES  
Filed Feb. 5, 1925



## B01F 7/00

Mixers with rotary stirring devices in fixed receptacles, [N: i.e. movement of the receptacle not being meant to effect the mixing ([B01F 13/08](#) takes precedence)]; Kneaders ([B01F 13/04](#) takes precedence; [N: devices especially adapted for mixing foundry sand [B22C 5/04](#)])

### Definition statement

*This subclass/group covers:*

The mixing of materials by means of rotary stirring devices.

### References relevant to classification in this group

*This subclass/group does not cover:*

The mixing of materials by means of moveable stirrers, said movement not being a rotating movement or which are subjected to an additional oscillatory movement	<a href="#">B01F 11/00</a>
Magnetic mixers	<a href="#">B01F 13/08</a>
Mixers combined with safety devices	<a href="#">B01F 13/04</a>

Devices especially adapted for mixing foundry sand	<a href="#">B22C 5/04</a>
--	---------------------------

### Special rules of classification within this group

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

### B01F 7/00008

[N: Stirrers, i.e. rotary stirring devices (**B01F3/04C5B8**, [B01F 3/04588](#), [B01F 3/0478](#), [B01F 7/028](#), [B01F 11/0091](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Specific details of rotary stirrers, i.e. their constructional details and geometric design either not covered by the subgroups [B01F 7/02](#) and [B01F 7/16](#) or details of the stirrers not linked to a specific orientation within a container.

### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

The stirrer rotating about a horizontal axis; Stirrers therefor	<a href="#">B01F 3/04588</a>
Stirrers therefor	<a href="#">B01F 3/0478</a>
Mixers with rotary stirring devices in fixed receptacles provided with buckets	<a href="#">B01F 7/028</a>
Stirrers constructions	<a href="#">B01F 11/0091</a>

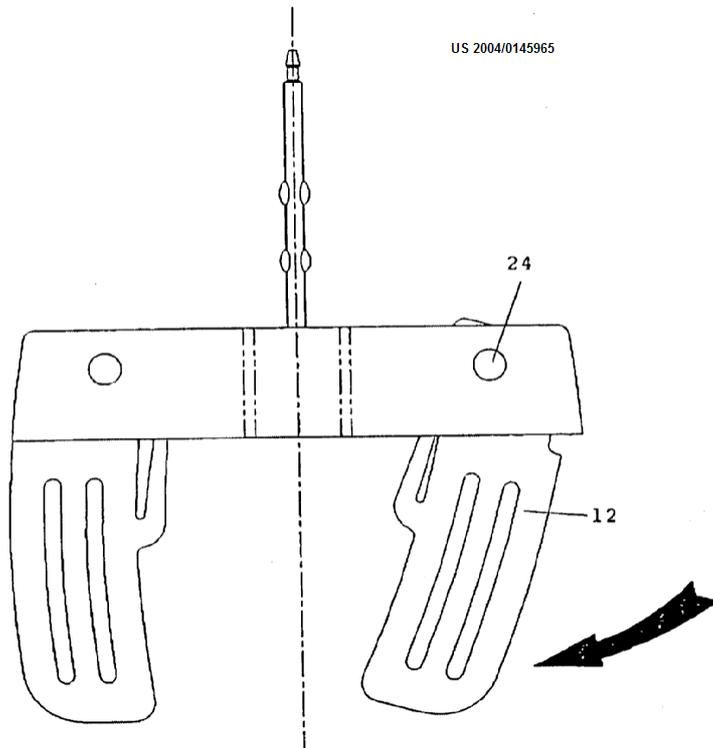
### B01F 7/00058

[N: with mechanical means to alter the position of the stirring elements]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



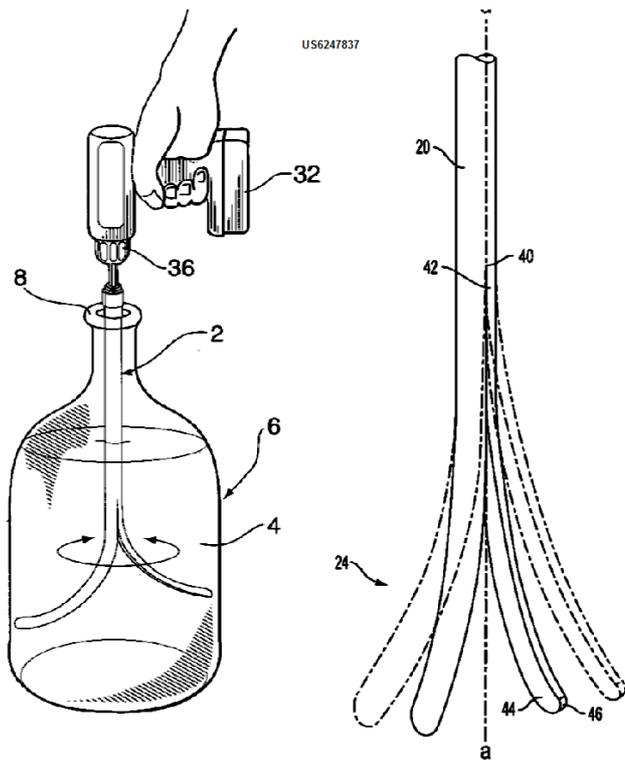
## **B01F 7/00066**

**[N: deformable by centrifugal force]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



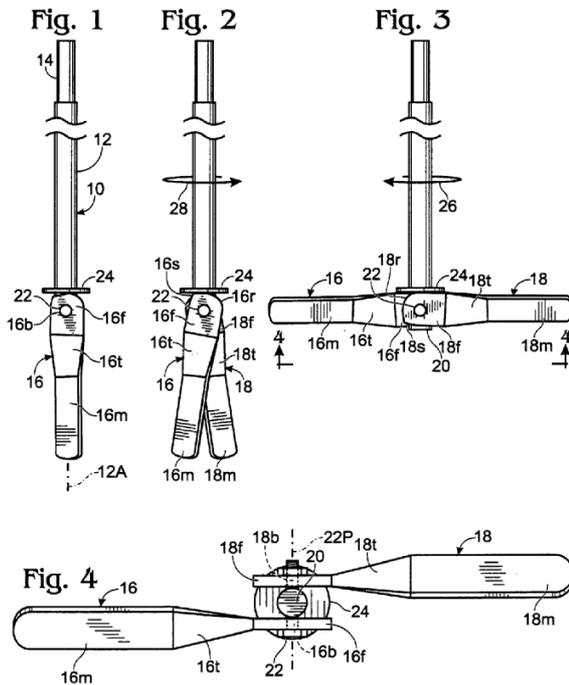
## B01F 7/00075

[N: the position of the stirring elements depending on the direction of rotation of the stirrer]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/001

[N: Fixing of the stirrer to the shaft]

### Definition statement

*This subclass/group covers:*

Details for attaching the mixing elements to the rotating shaft.

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Devices for fastening or securing constructional elements or machine parts together	<a href="#">F16B</a>
---	----------------------

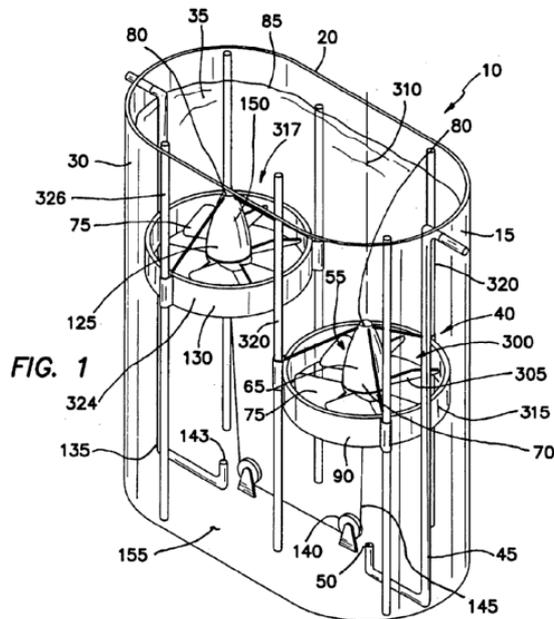
## B01F 7/00183

[N: with stirring elements moving with respect to the stirrer shaft, e.g. floating or comprising contracting chambers]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## **B01F 7/0025**

**[N: with arms, paddles, vanes or blades]**

### **Definition statement**

*This subclass/group covers:*

Stirrers producing a flow with a radial component.

## **B01F 7/00341**

**[N: Propellers, i.e. stirrers having an axial outflow, e.g. of the ship or aircraft propeller type or having means on the propeller to guide the flow]**

### **Definition statement**

*This subclass/group covers:*

Stirrers producing an axial movement on the flow.

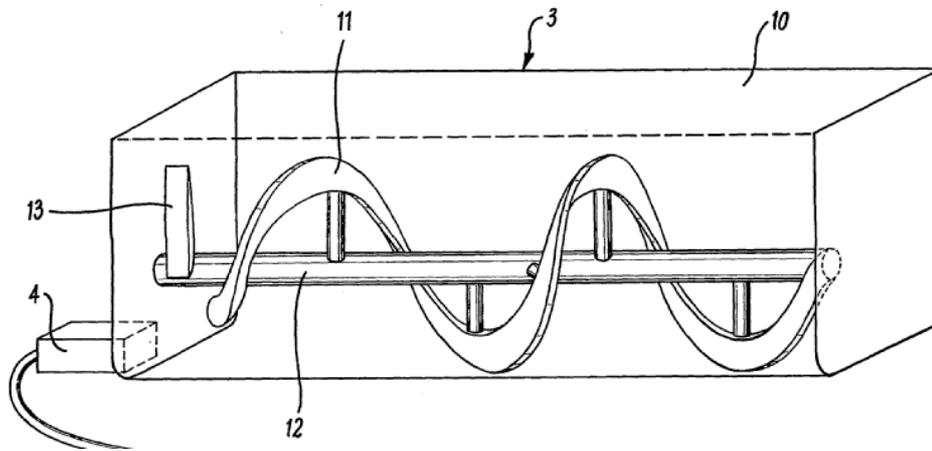
## **B01F 7/00433**

**[N: ribbon shaped, i.e. with an open space between the helical ribbon flight and the rotating axis]**

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



WO 2009/106794

2/2

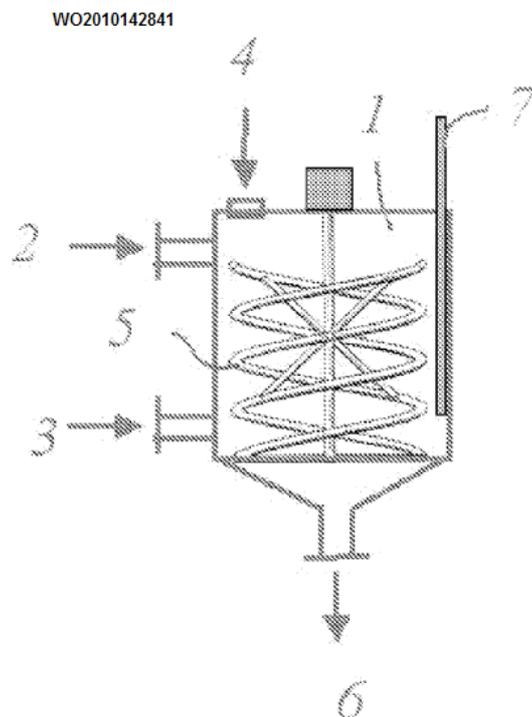
## B01F 7/00441

[N: forming open frameworks or cages]

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



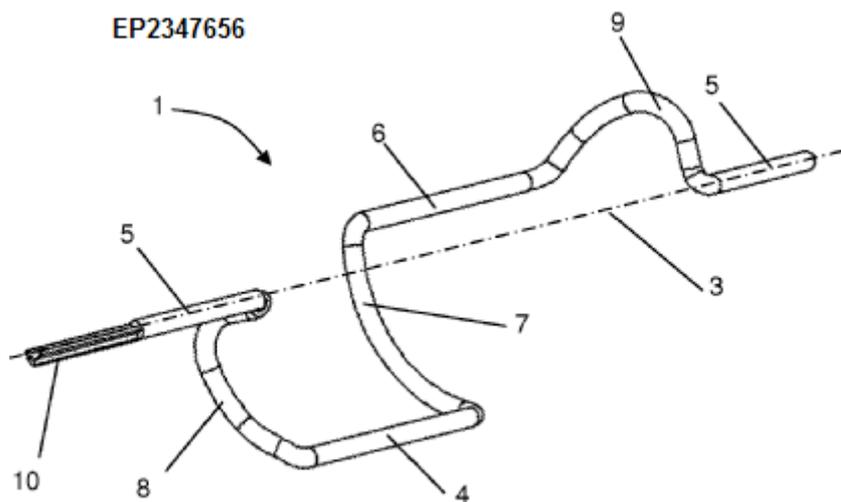
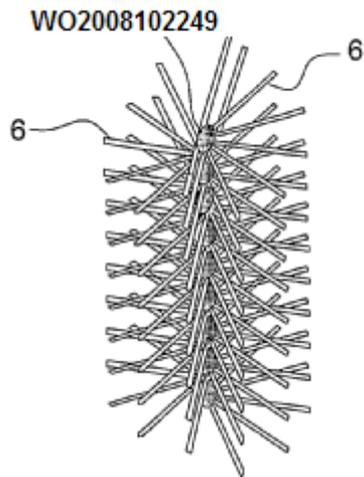
## B01F 7/00566

[N: with rigid wires or flexible rods]

### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.



## B01F 7/00575

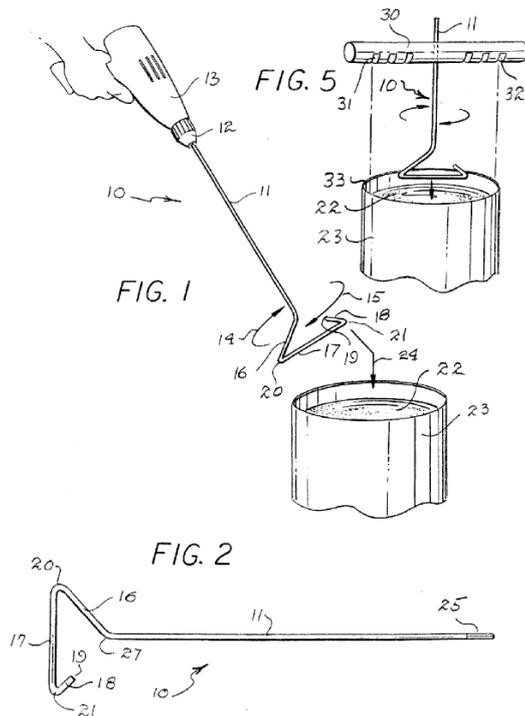
[N: with a bent rod of non helical configuration supported at one end]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication Oct. 30, 2003 Sheet 1 of 2 US 2003/0202420 A1



## B01F 7/00583

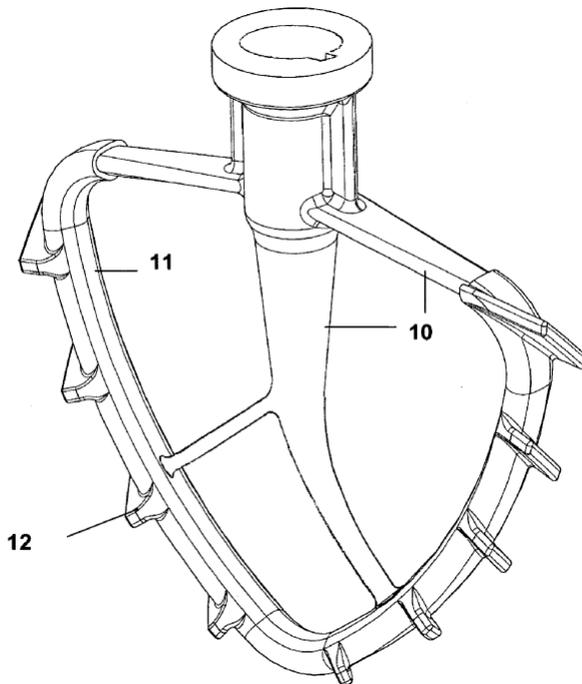
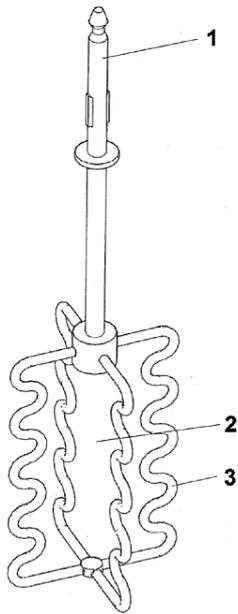
[N: Openwork frame or cage stirrers not provided for elsewhere]

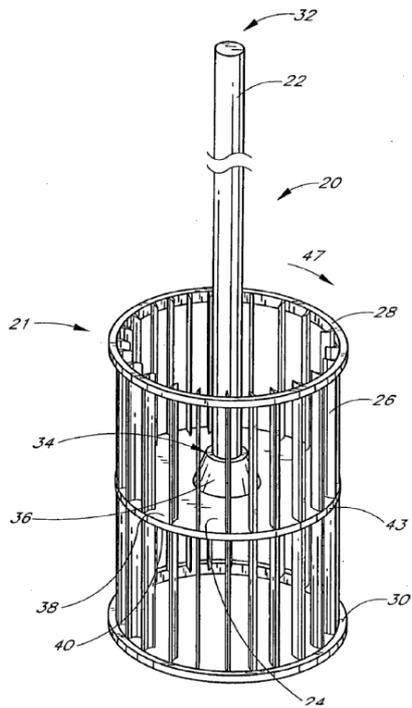
### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

**Figur 1**





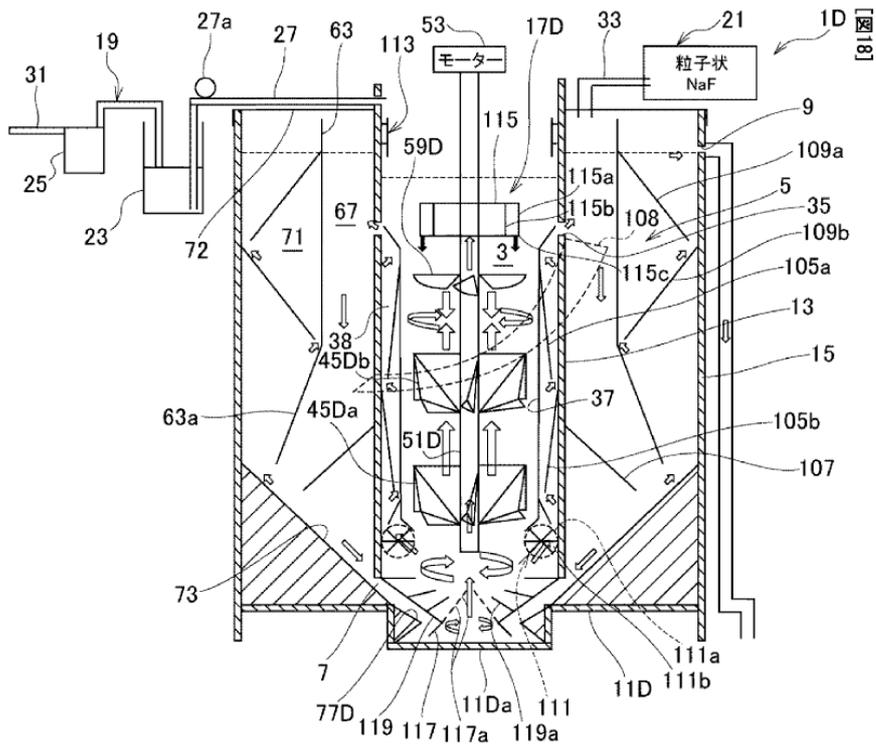
## B01F 7/00591

[N: provided with tubes for guiding the material]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



WO 2009/028194

PCT/JP2008/002345

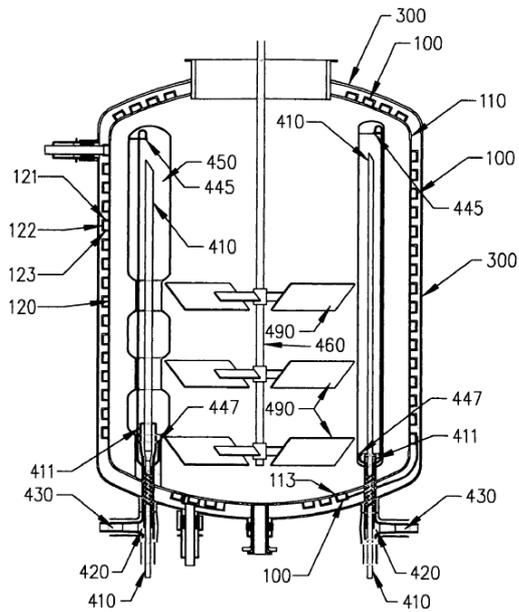
**B01F 7/00633**

**[N: provided with a plurality of similar elements]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



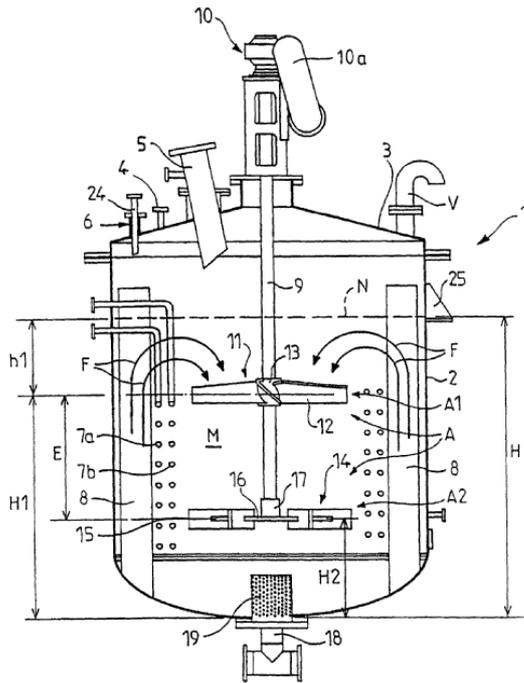
**B01F 7/00641**

**[N: provided with a plurality of dissimilar elements]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/0065

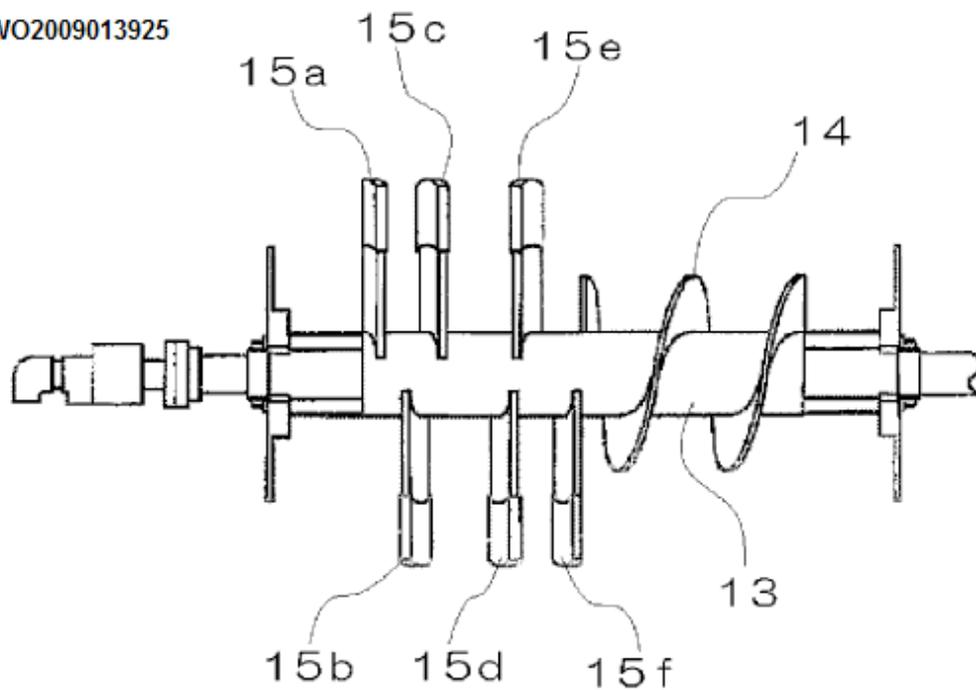
[N: comprising helical elements and paddles]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

WO2009013925



## B01F 7/00675

[N: The axis being a flexible shaft]

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Flexible shafts	<a href="#">F16C 1/00</a>
-----------------	---------------------------

## B01F 7/00708

[N: The axis comprising stirring means and feeding or discharging means fixed on the same axis]

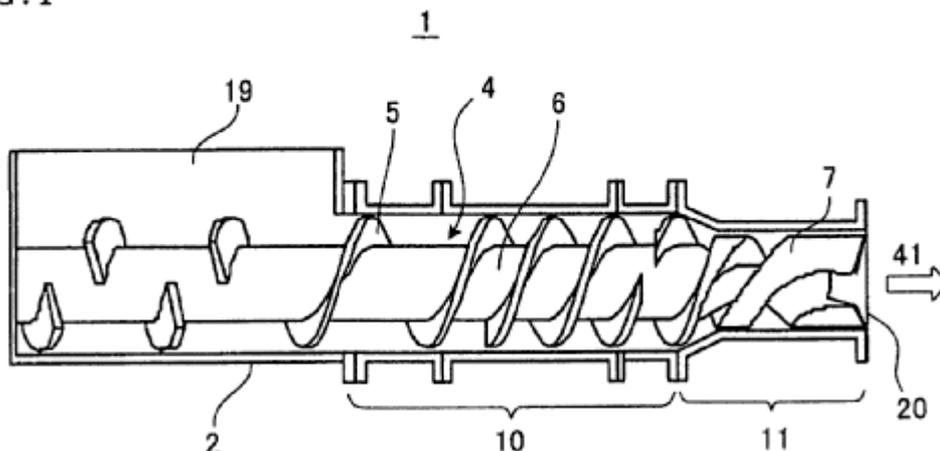
### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

FIG. 1

EP2103403



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Mixers for cement	<a href="#">B28C 5/1292</a>
-------------------	-----------------------------

### B01F 7/00725

[N: Connection of the rotating axis with the drive]

### Definition statement

This subclass/group covers:

Details for attaching the rotating shaft to the drive unit.

### References relevant to classification in this group

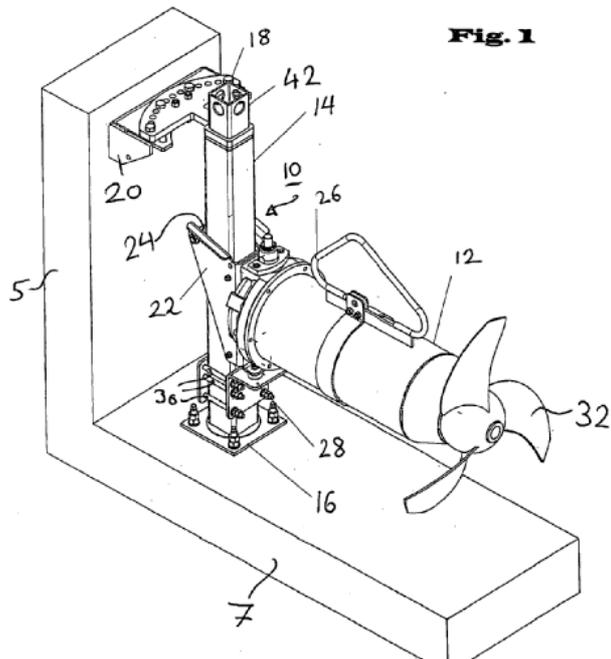
This subclass/group does not cover:

Couplings for connecting two shafts together	<a href="#">F16D</a>
--	----------------------

### B01F 7/00733

[N: Submerged mixers, i.e. with a submerged stirrer and drive unit, e.g. displaceable on a vertical beam (submerged stirring devices for introducing a gas in a liquid **B01F3/04C5F**)]





## **B01F 7/00758**

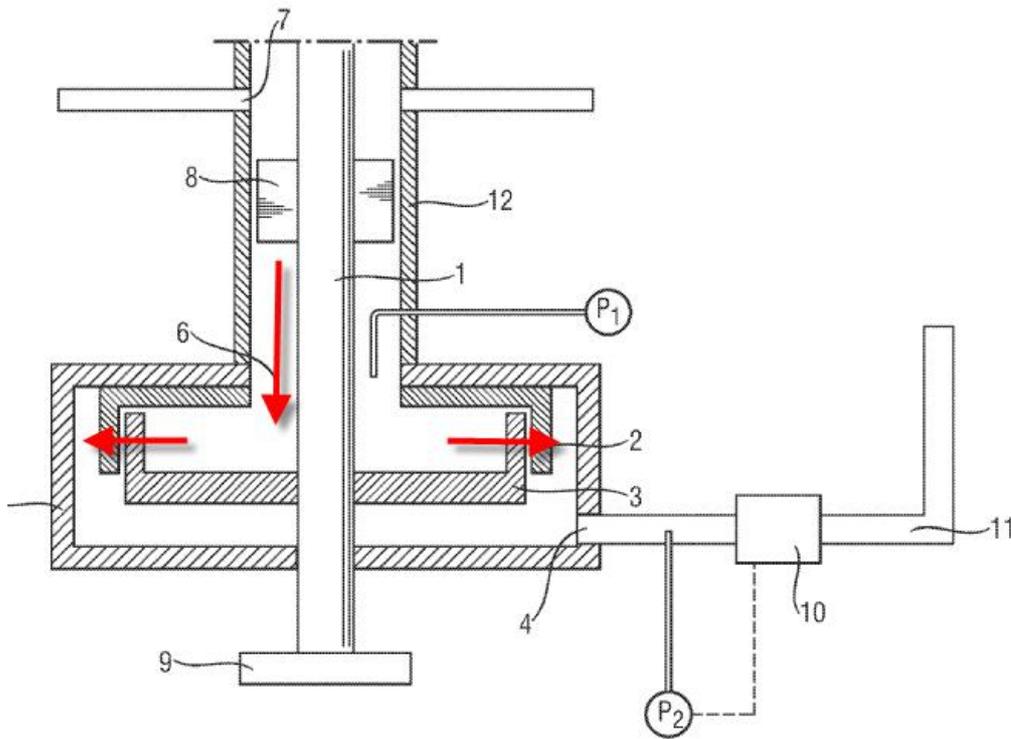
**[N: the stator rotor system being formed by substantial flat surfaces]**

### **Definition statement**

*This subclass/group covers:*

Rotor-stator systems in which the material flows between the rotor and the stator in a radial direction with regard to the rotating shaft.

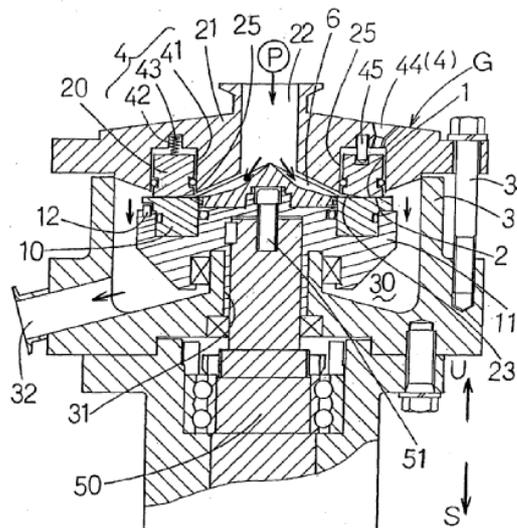
Examples:



EP 1 884 541 A1

EP 1 382 380 A1

FIG 1



**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Crushing or disintegrating disc mills	<a href="#">B02C 7/005</a> , <a href="#">B02C 7/02</a> , <a href="#">B02C 7/04</a> , <a href="#">B02C 7/06</a> , <a href="#">B02C 7/08</a>
---------------------------------------	---

Disc mills (paper making)	<a href="#">D21D 1/30</a>
---------------------------	---------------------------

**B01F 7/00766**

[N: provided with intermeshing elements]

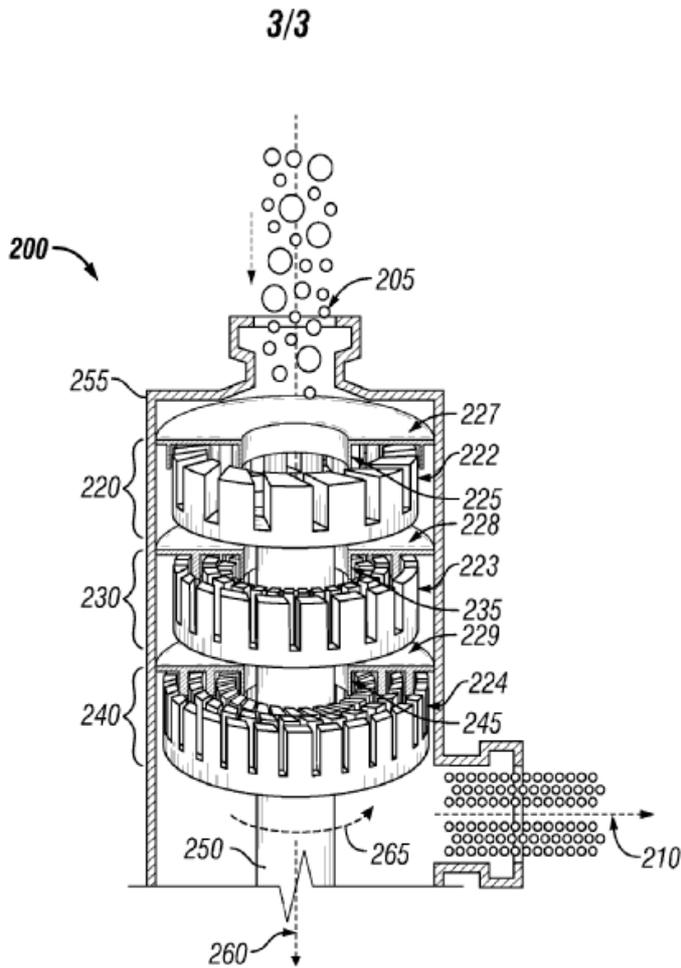
**Definition statement**

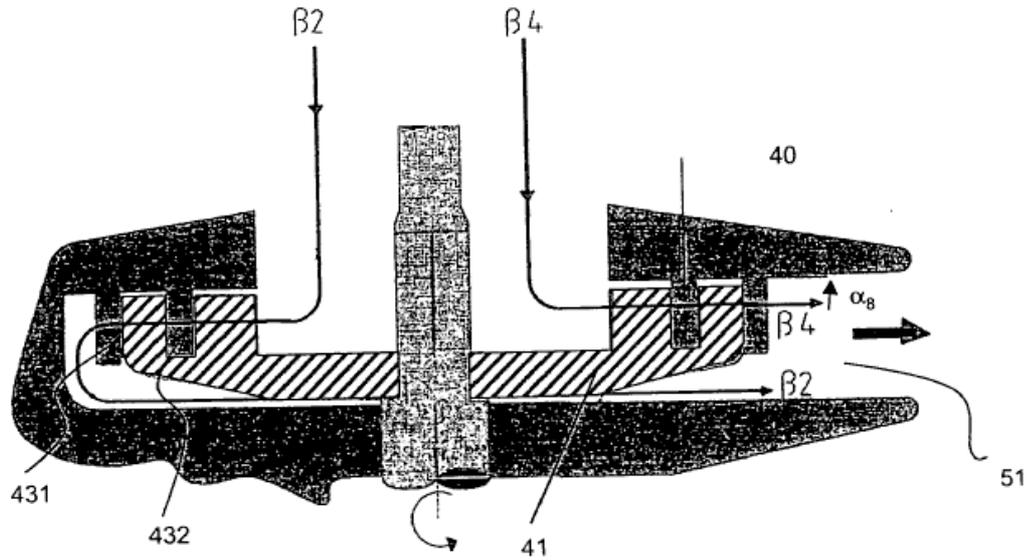
*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

WO 2009/017909

PCT/US2008/068169





## B01F 7/00775

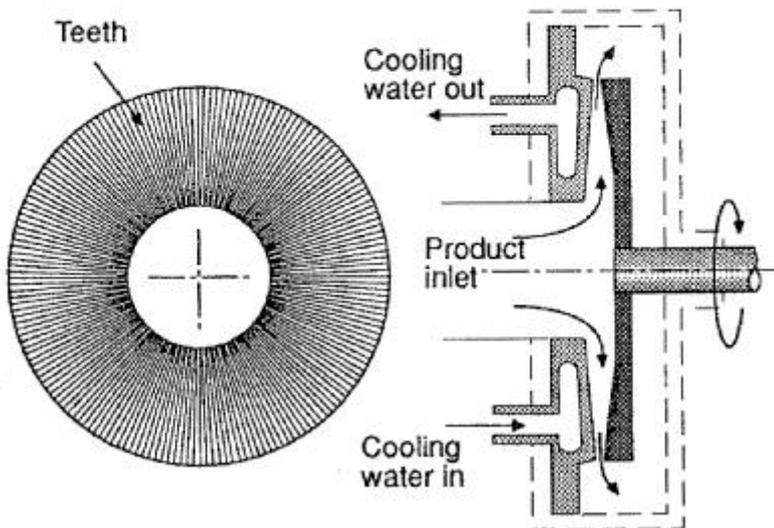
[N: provided with ribs, ridges or grooves on one surface]

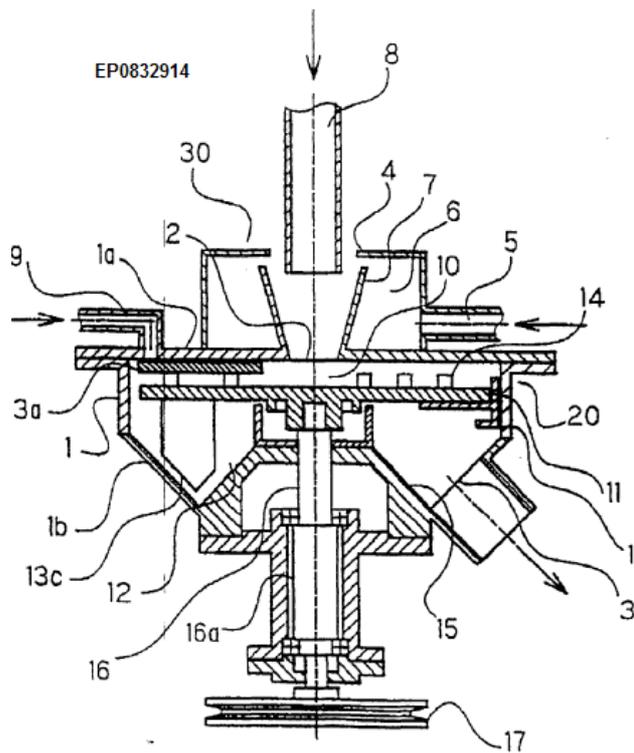
### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

EP 2 172 513 A1





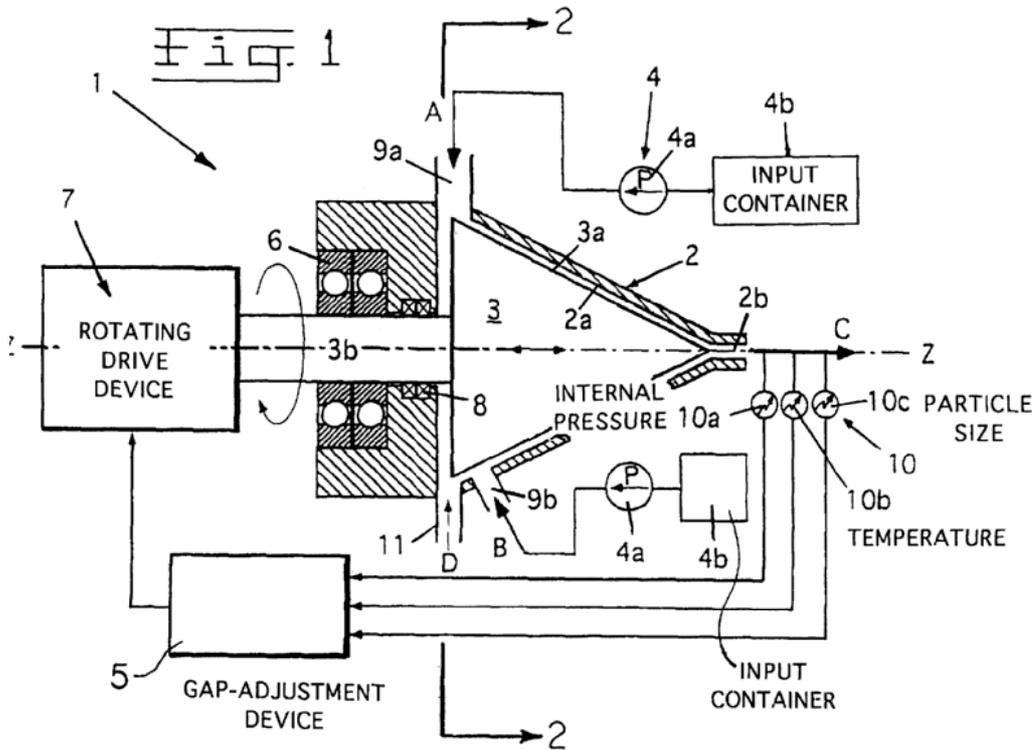
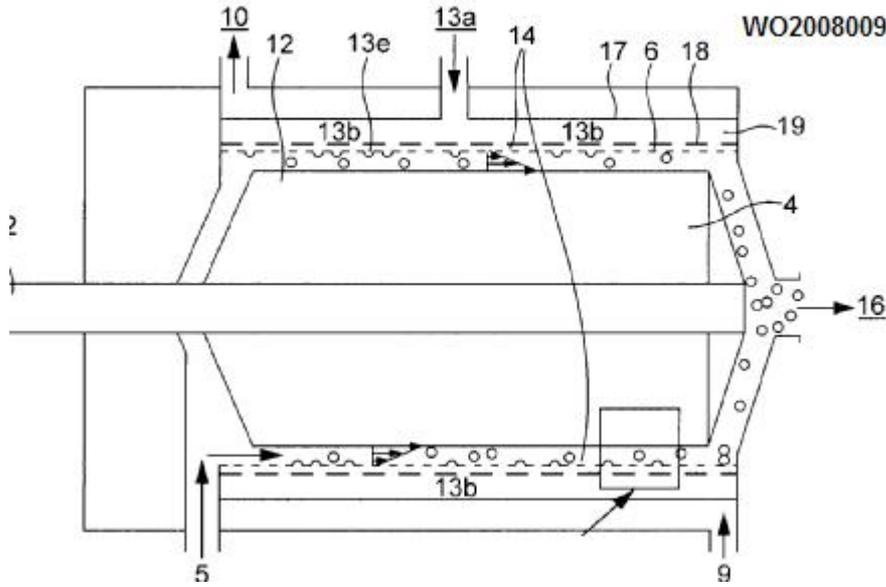
## B01F 7/008

[N: the stator rotor system being formed by conical or cylindrical surfaces, e.g. curved surfaces]

### Definition statement

*This subclass/group covers:*

Rotor-stator systems in which the material flows between the rotor and the stator in a direction substantially parallel to the rotating shaft. The form of the rotor and/or the stator can be substantially cylindrical or substantially conical. Examples:



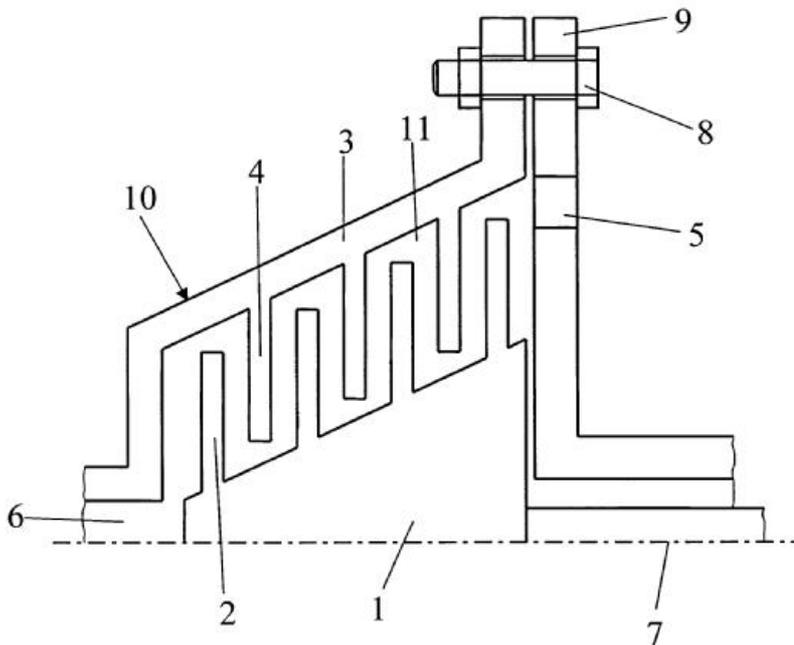
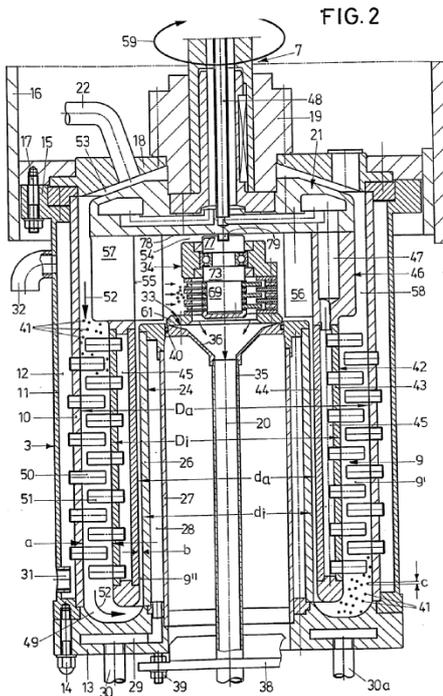
**B01F 7/00808**

[N: provided with intermeshing elements]

**Definition statement**

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.



**B01F 7/00816**

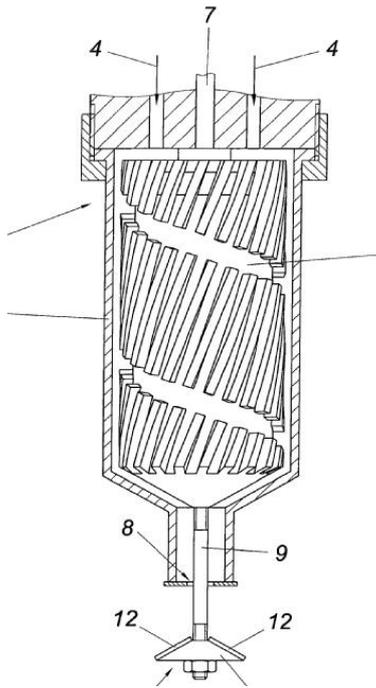
[N: provided with ribs, ridges or grooves on one surface]

**Definition statement**

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

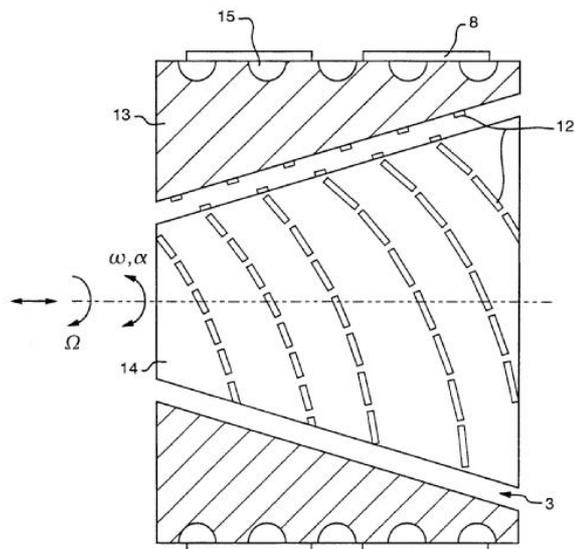
EP 1 655 425 A1

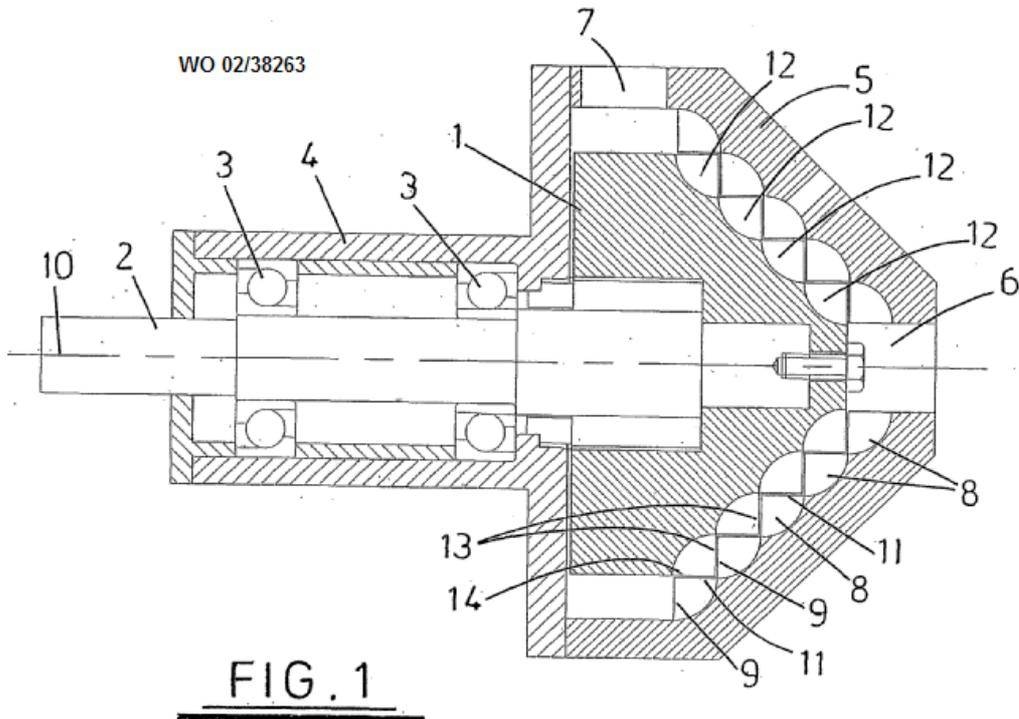
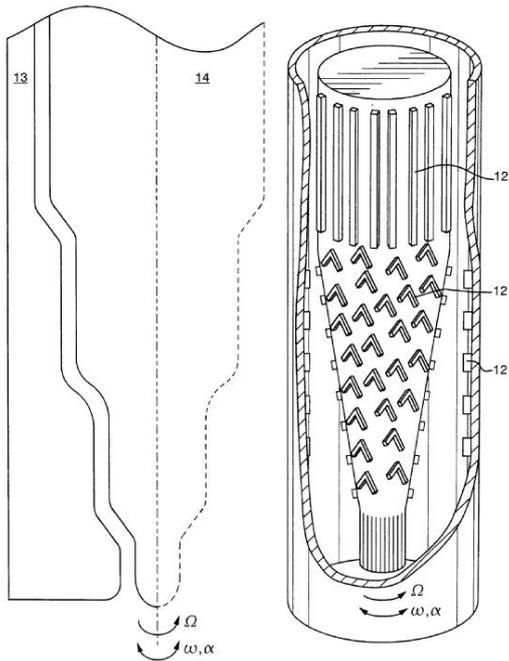


WO 00/76735

PCT/US00/16086

4/17





**B01F 7/0085**

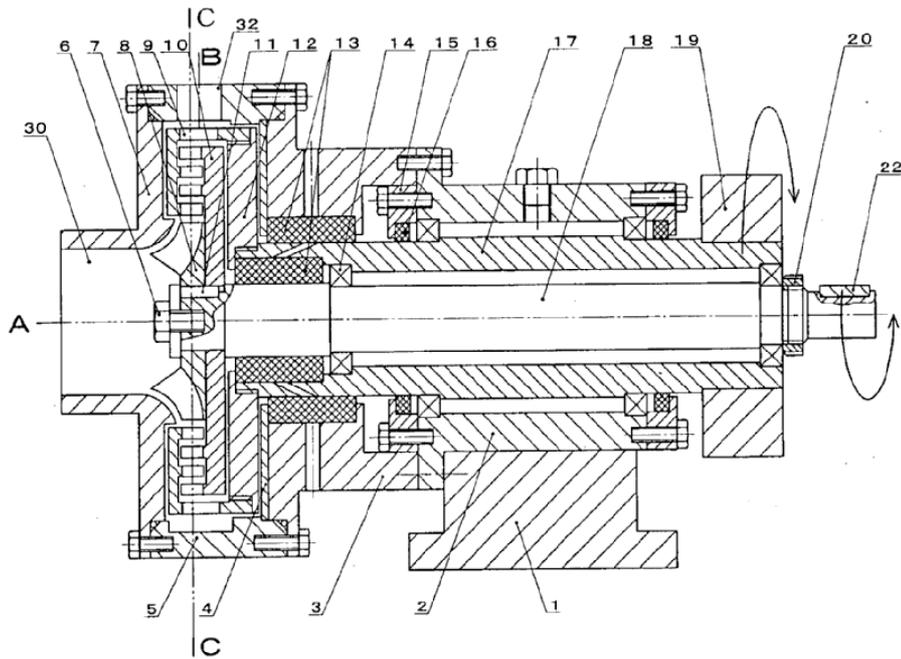
[N: the stirring devices being composed of two independently driven coaxial rotors facing each other, e.g. having intermeshing teeth]

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication Oct. 30, 2003 Sheet 1 of 4 US 2003/0202421 A1



## B01F 7/00858

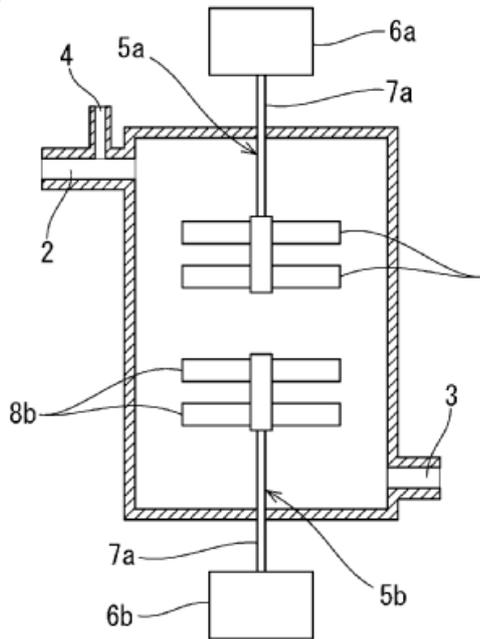
[N: with rotating surfaces facing each other]

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

[Fig. 1]



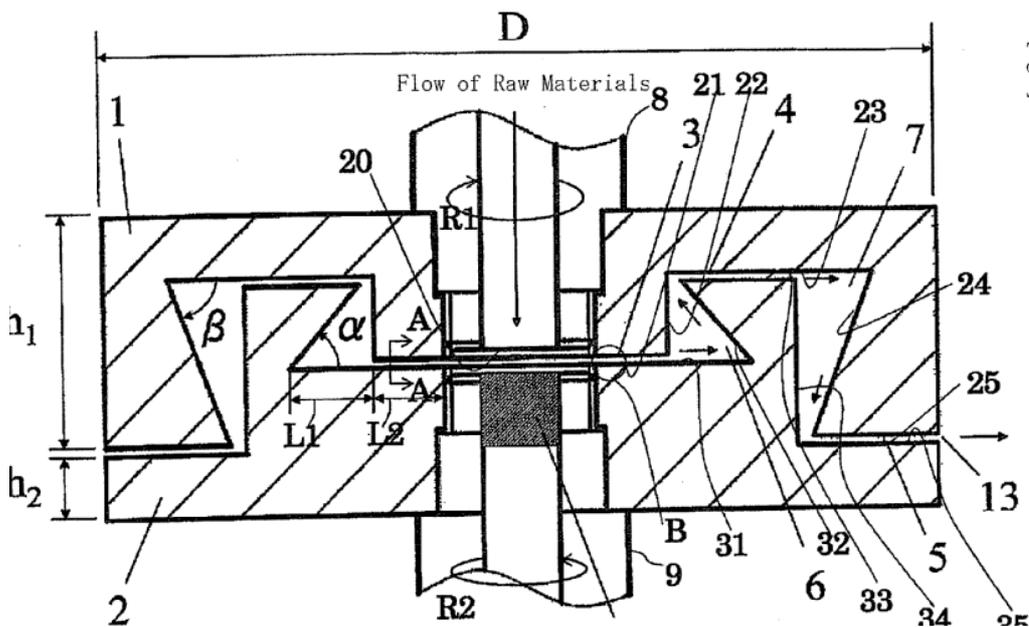
**B01F 7/00866**

[N: provided with intermeshing elements]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



[Fig. 1]

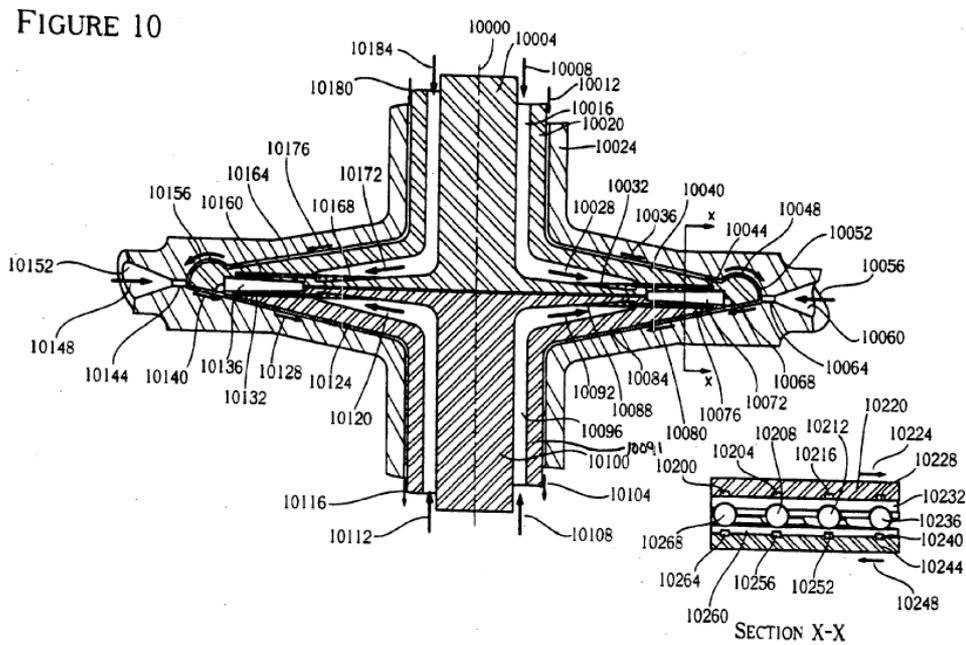
## B01F 7/00875

[N: provided with ribs, ridges or grooves on one surface]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/00883

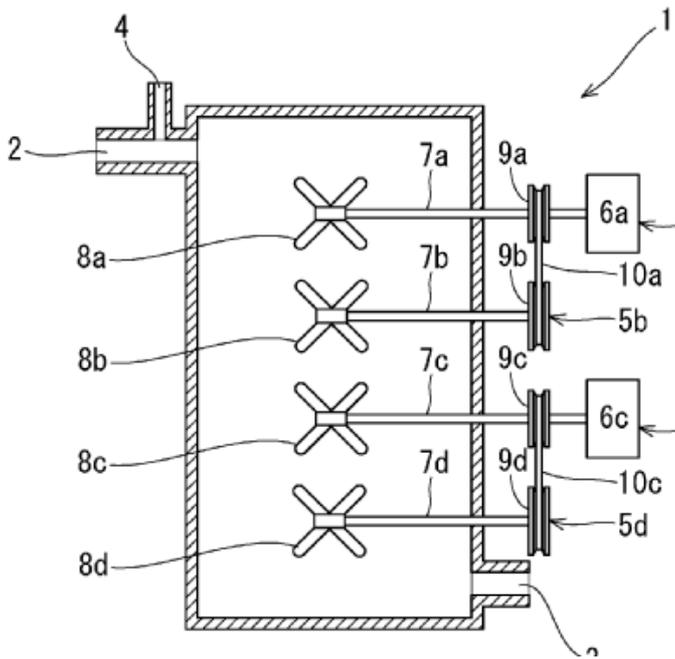
[N: with rotating surfaces next to one another, e.g. on parallel axis]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

[圖3]



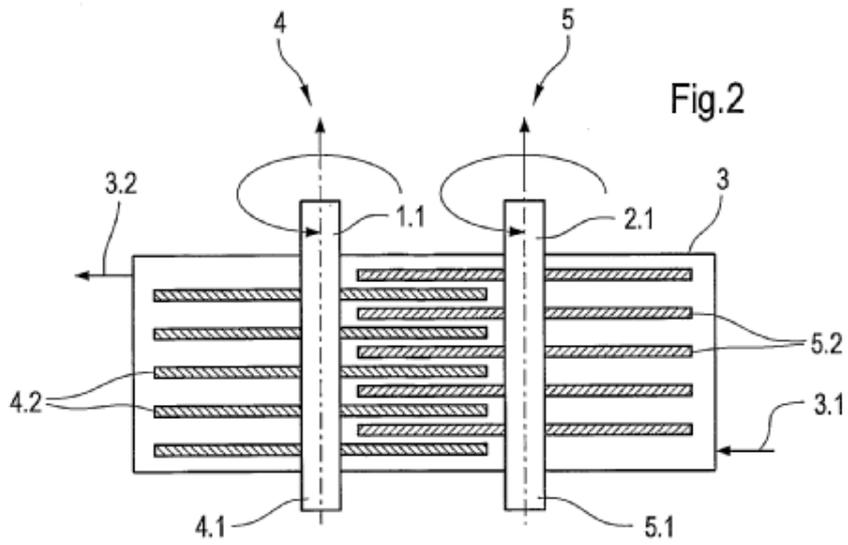
## B01F 7/00891

[N: provided with intermeshing elements]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



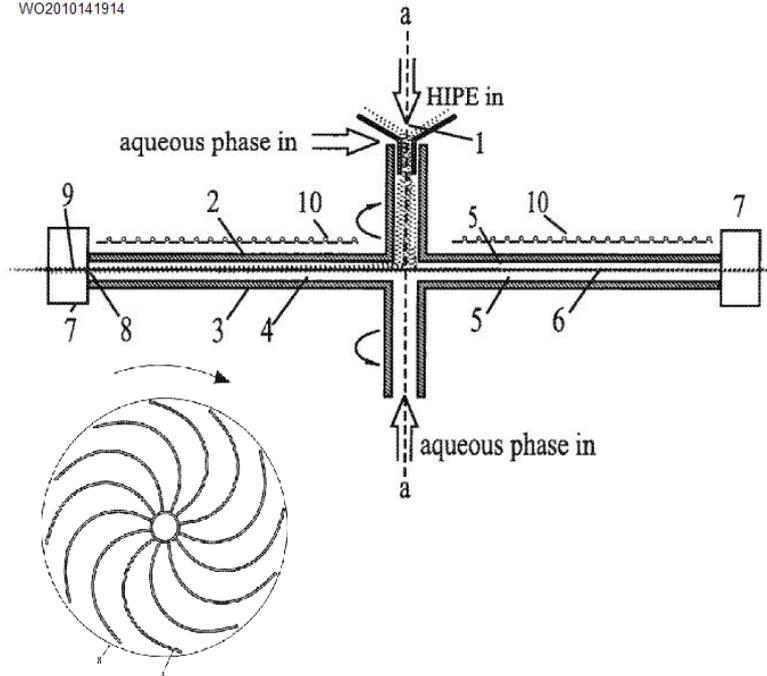
**B01F 7/009**

[N: provided with ribs, ridges or grooves on one surface]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/00908

[N: Pipe mixers, i.e. mixing material flowing continuously through pipes, e.g. column mixers]

### Definition statement

*This subclass/group covers:*

Rotary stirrers arranged in a pipe or conduit through which the materials flow in a continuous way.

Examples:

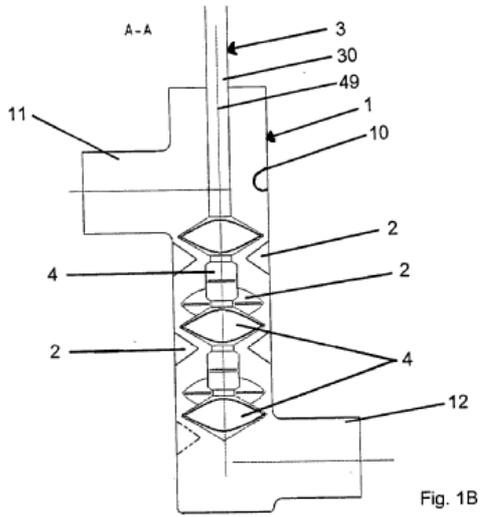


Fig. 1B

WO 2009/087193

2/4

PCT/EP2009/050174

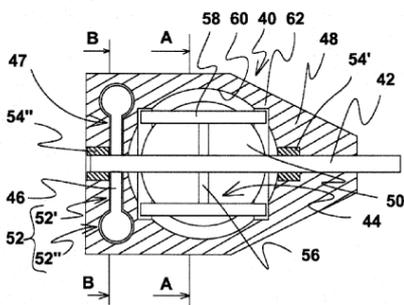


Fig. 2

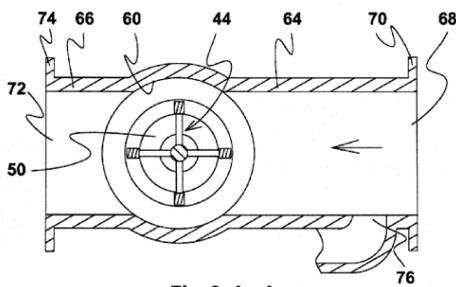
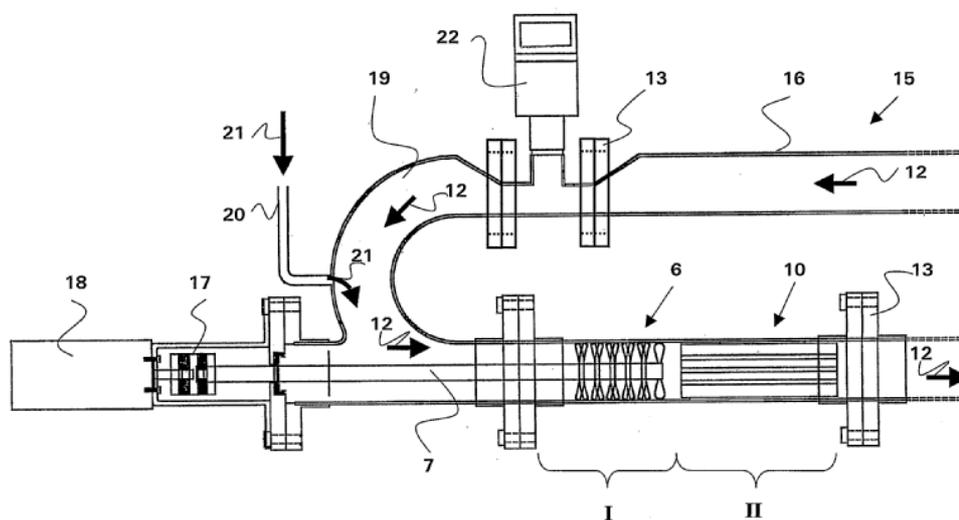


Fig. 3 A - A



2 / 4

### B01F 7/00916

[N: the stirrer being driven by the moving material]

#### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

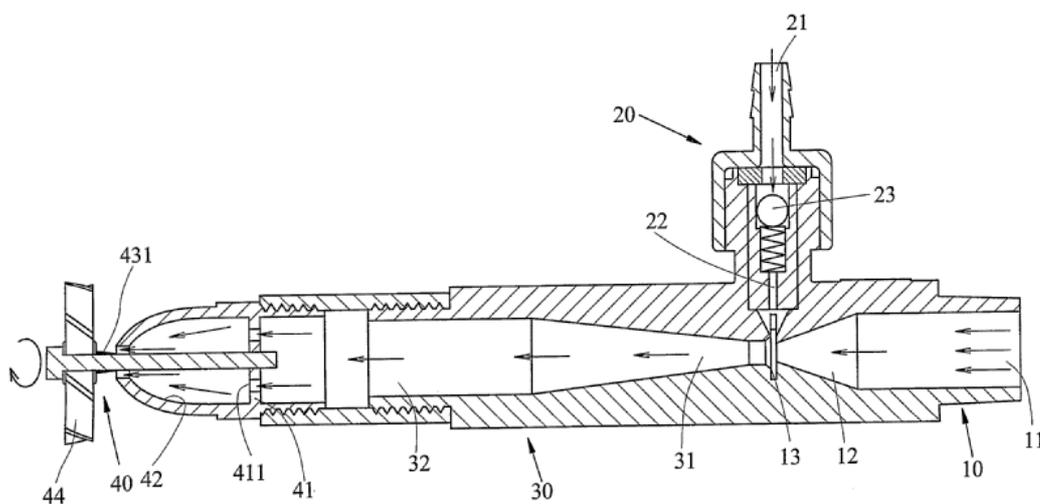
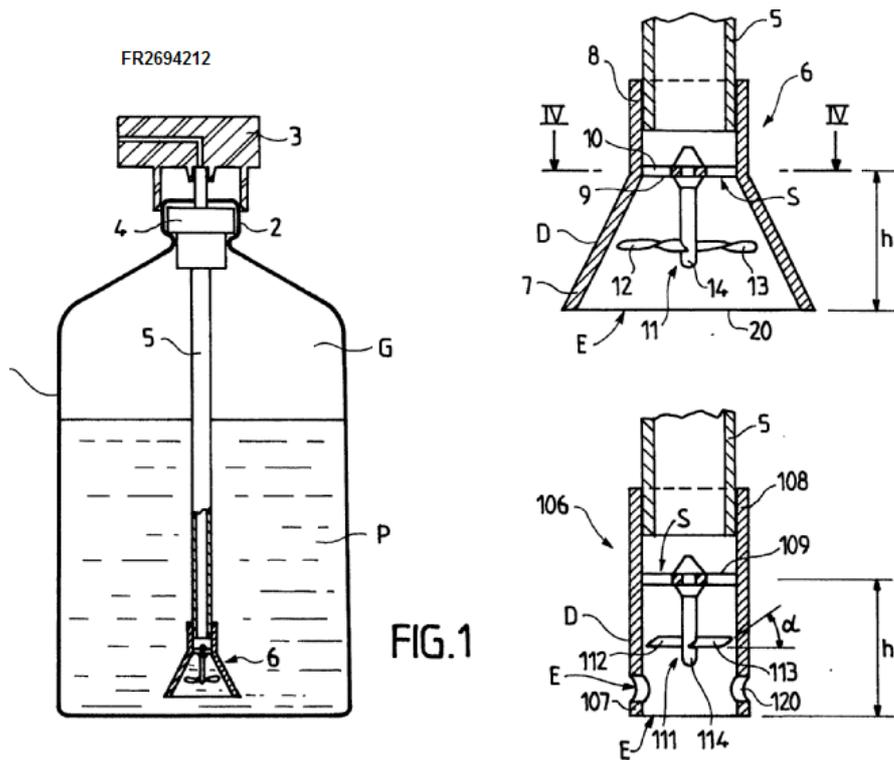


图 3



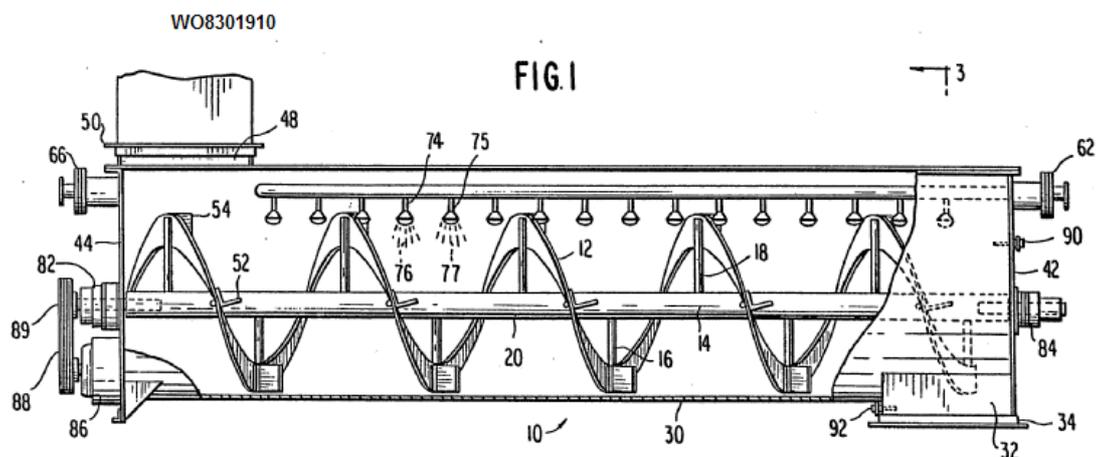
## B01F 7/022

[N: comprising liquid feeding, e.g. spraying means (in general [B01F 15/0203](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/024

[N: the liquid being fed through the shaft of the stirrer]

## Definition statement

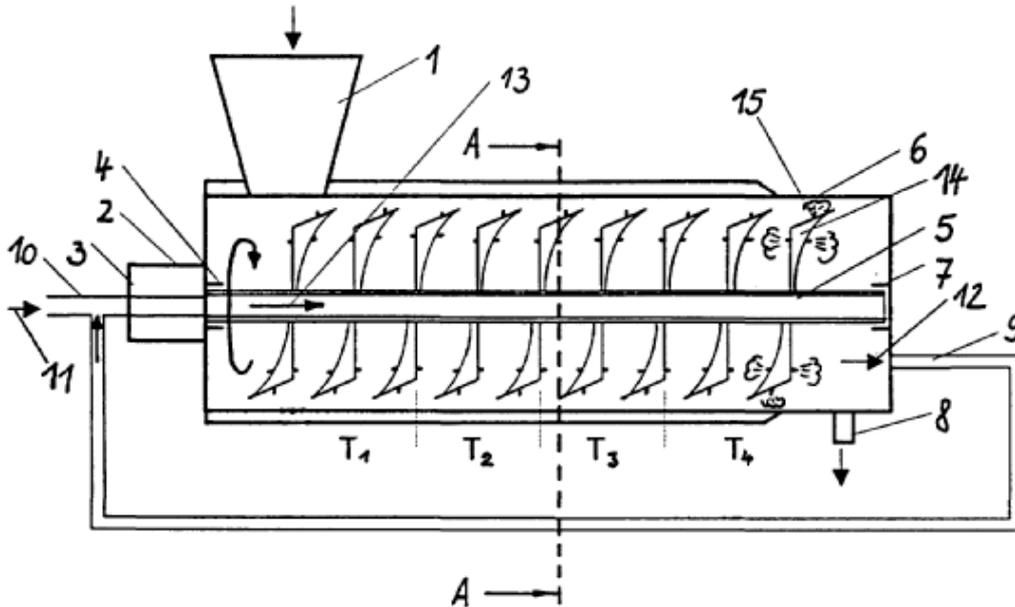
*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

ZEICHNUNGEN SEITE 1

Nummer:  
Int. Cl.7:  
Offenlegungstag:

DE 198 57 775 A1  
B 01 F 7/02  
8. Juni 2000



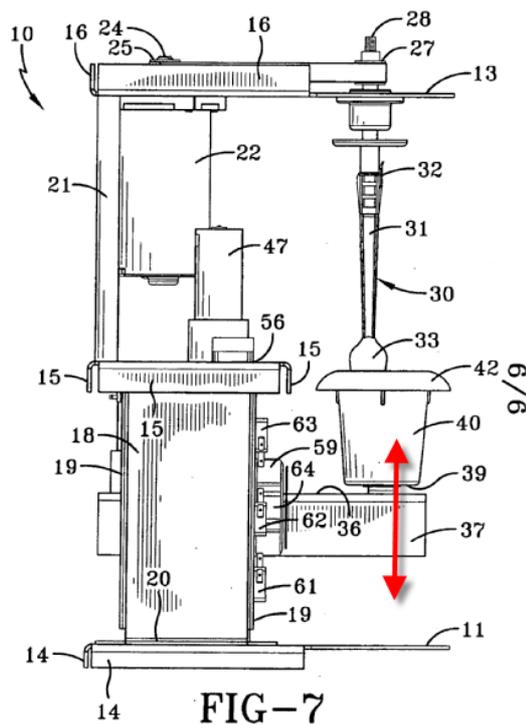
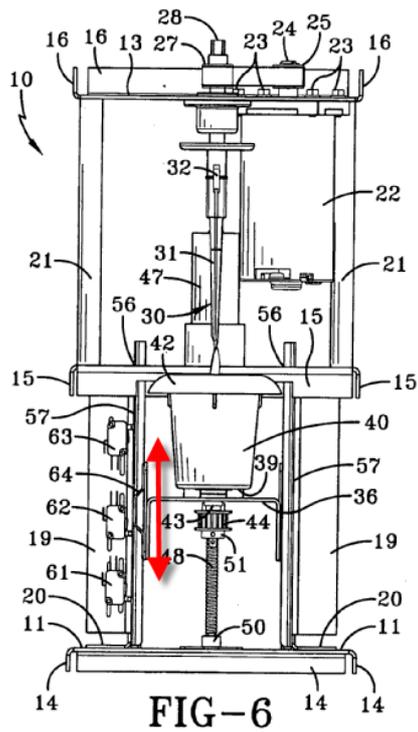
## B01F 7/1605

[N: with relative displacement, e.g. vertical, between stirrer and receptacle for bringing them into operative position, e.g. with an independent receptacle or with means to close the receptacle; Fixing elements for the receptacle]

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



WO 2011/08234

PCT/US2010/01565

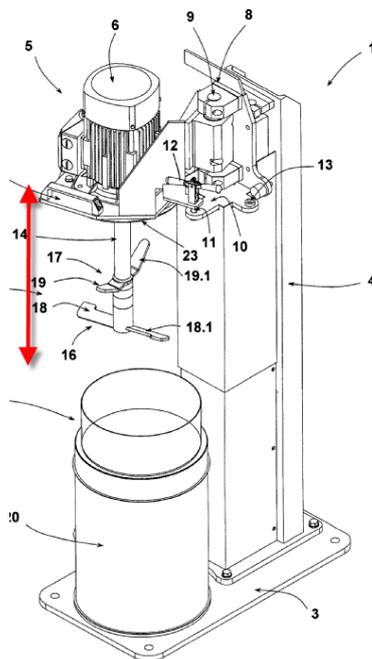
## B01F 7/161

[N: with vertical displacement of the stirrer, e.g. with additional means for axially displacing or for pivoting the stirrer about a vertical axis in order to co-operate with several receptacles]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/1615

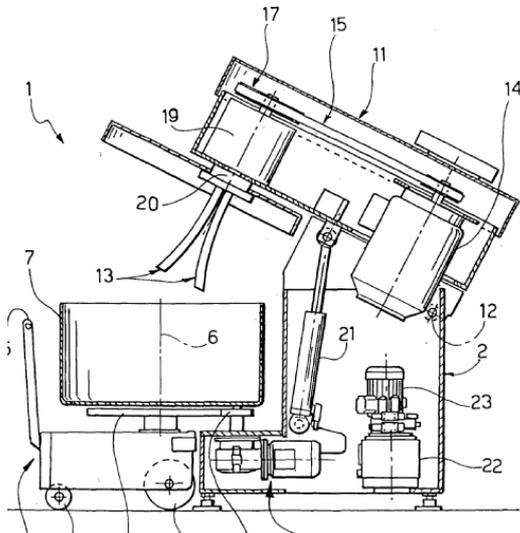
[N: with the stirrer-head pivoting about a horizontal axis to bring the stirrer in and out of operative position, e.g. with a receptacle pivoting about a horizontal axis for emptying]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

FIG. 4



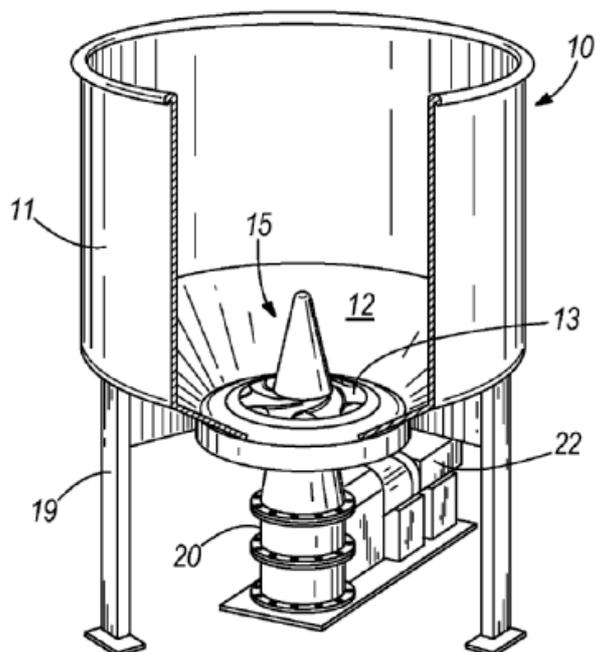
## B01F 7/162

[N: the stirrers being driven from the bottom of the receptacle]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



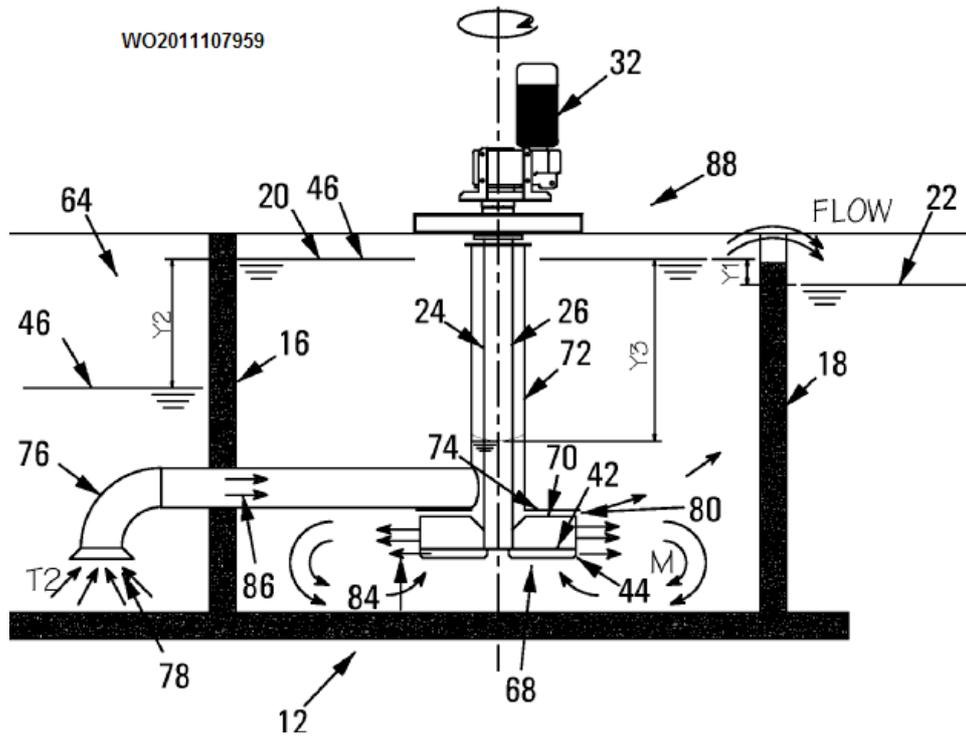
## B01F 7/1625

[N: the stirrers having a central axial inflow and a substantially radial outflow, e.g. centrifugal rotors with several rotors rotating in opposite direction]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/163

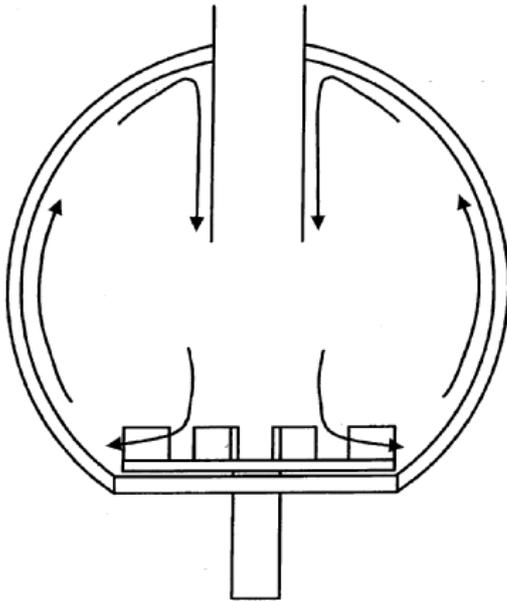
[N: with the inflow from one side only, e.g. stirrers placed on the bottom of the receptacle, or used as a bottom discharge pump]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

FIG. 2



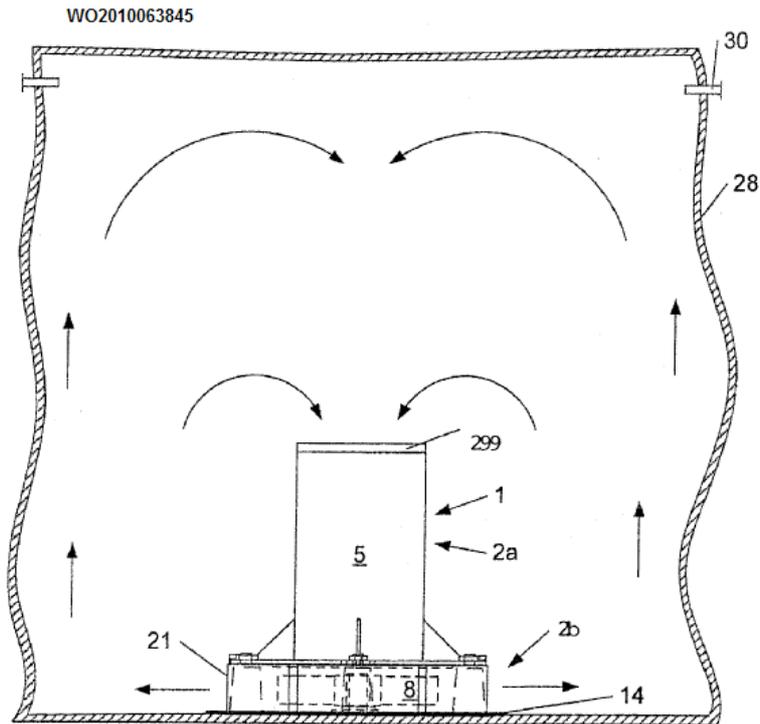
## B01F 7/1635

[N: the stirrers co-operating with stationary guiding elements, e.g. surrounding stators or intermeshing stators ([B01F 7/164](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this group

*This subclass/group does not cover:*

The stirrers co-operating with surrounding stators, or with intermeshing stators	<a href="#">B01F 7/164</a>
--	----------------------------

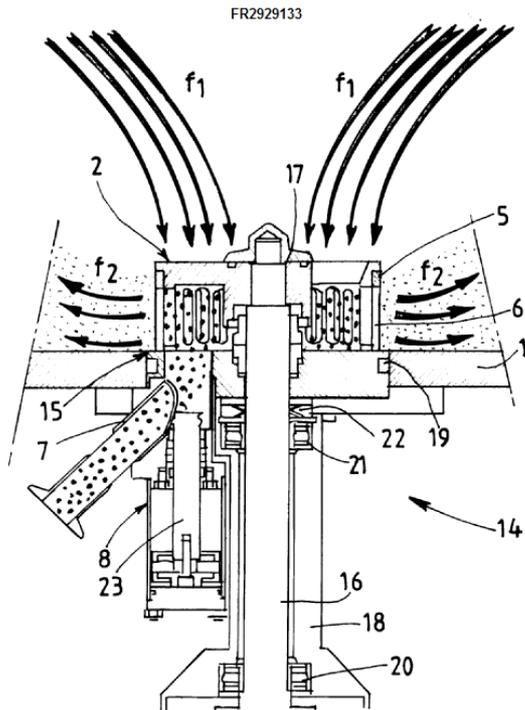
### **B01F 7/164**

**[N: the stirrers co-operating with surrounding stators, or with intermeshing stators, e.g. comprising slits, orifices or screens]**

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



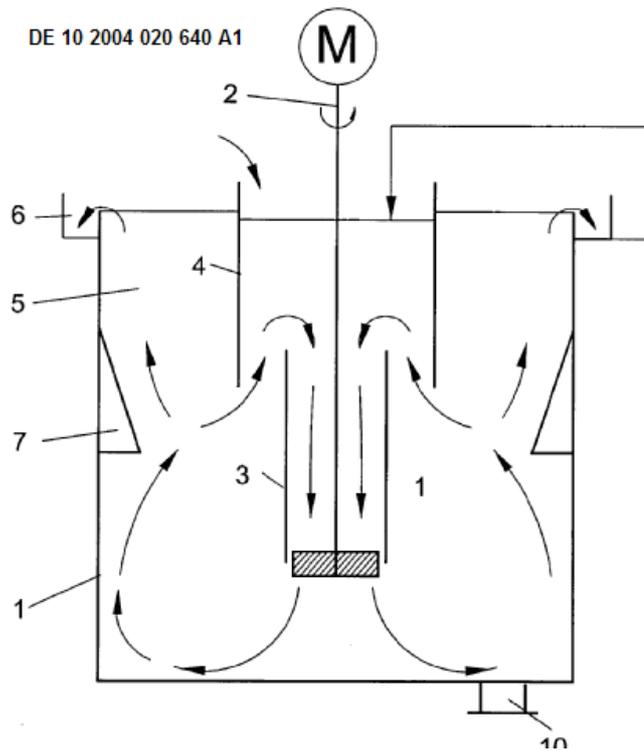
## B01F 7/1645

[N: the stirrers co-operating with stationary guiding elements  
([B01F 7/164](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 7/165

[N: Pan-type mixers, i.e. mixers in which the stirring elements move along the bottom of a pan-shaped receptacle (with stirring elements moving along the wall or bottom of the receptacle for scraping in general **B01F15/00B24**)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

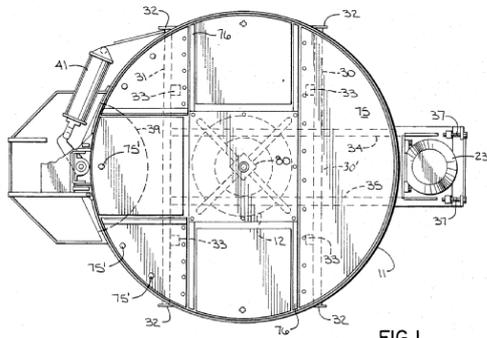


FIG. 1

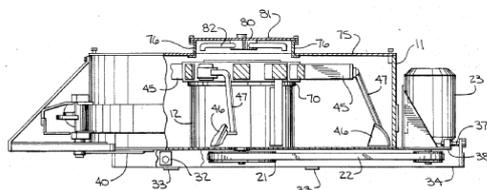


FIG. 2

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Pan-type mixers for cement	<a href="#">B28C 5/166</a>
----------------------------	----------------------------

### B01F 7/1655

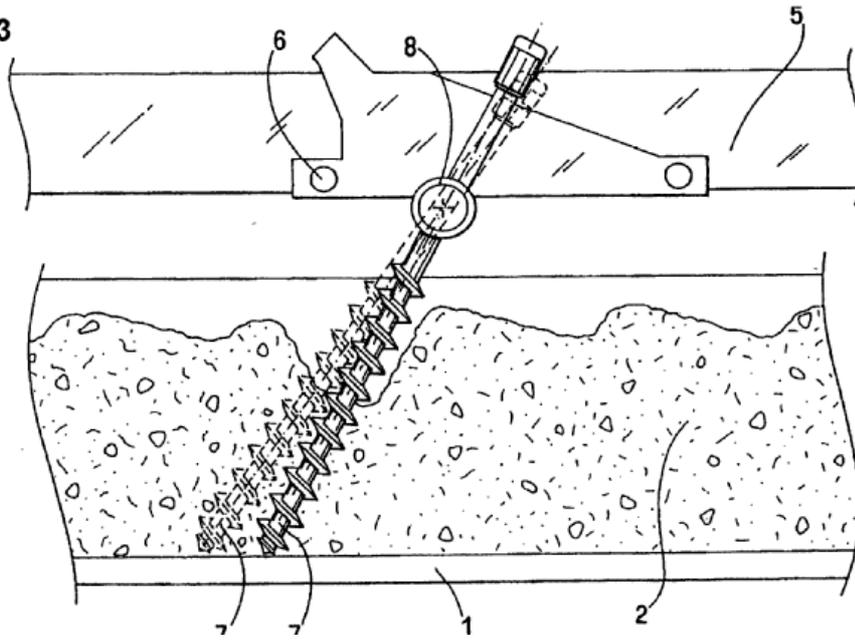
[N: the stirrers being additionally moved radially, or oscillating about an axis perpendicular to the stirrer axis ([B01F 7/30](#) takes precedence)]

### Definition statement

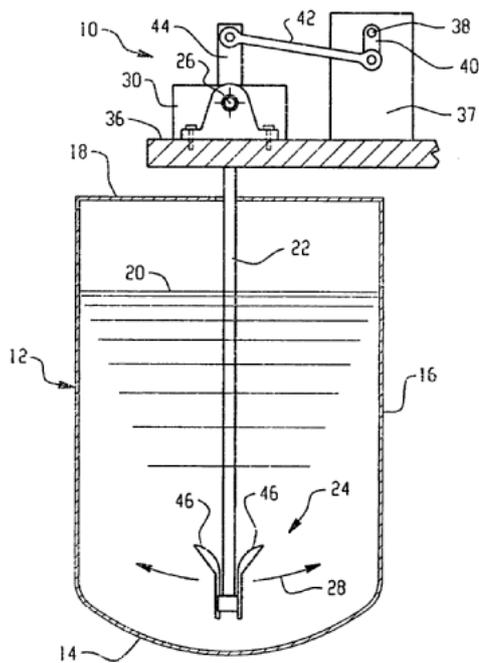
This subclass/group covers:

Illustrative examples of subject matter classified in this group.

Fig. 3



EP 1 908 742 A1



WO 02/094422

1/11

PCT/US02/15555

**References relevant to classification in this group**

*This subclass/group does not cover:*

With stirrers having planetary motion	<a href="#">B01F 7/30</a>
---------------------------------------	---------------------------

**B01F 7/166**

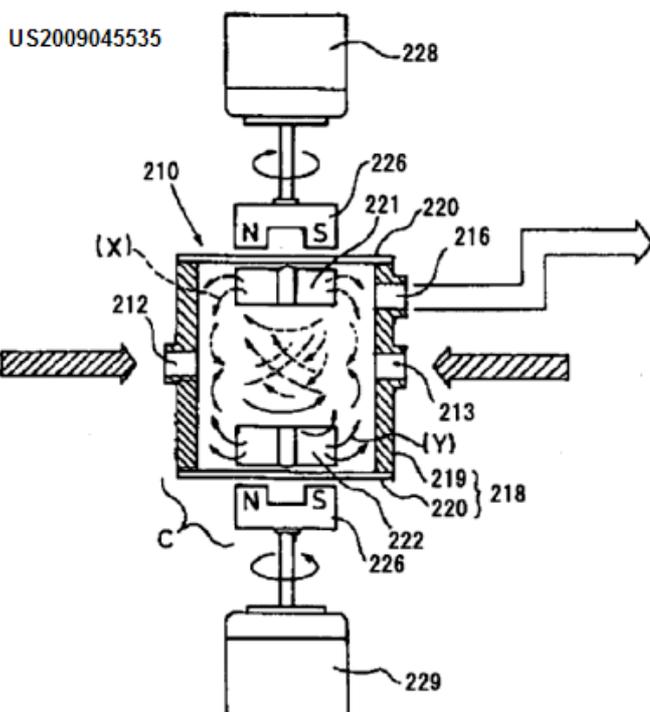
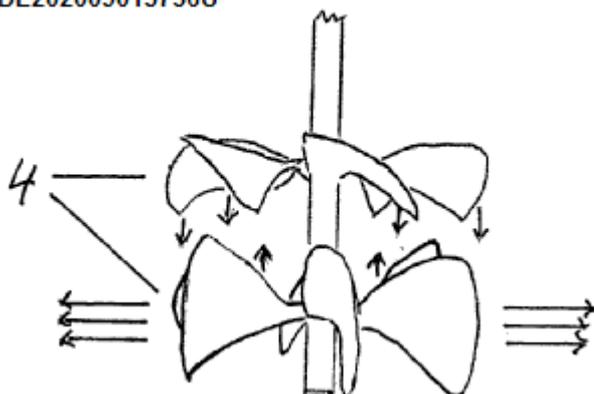
[N: with stirrers rotating at different speeds or in opposite direction about the same axis]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

DE202009013756U



### B01F 7/1665

[N: having two or more stirrers on separate shafts, e.g. the shape of the receptacle matching with the periphery of the rotating stirrers ([B01F 7/166](#) takes precedence)]

## Definition statement

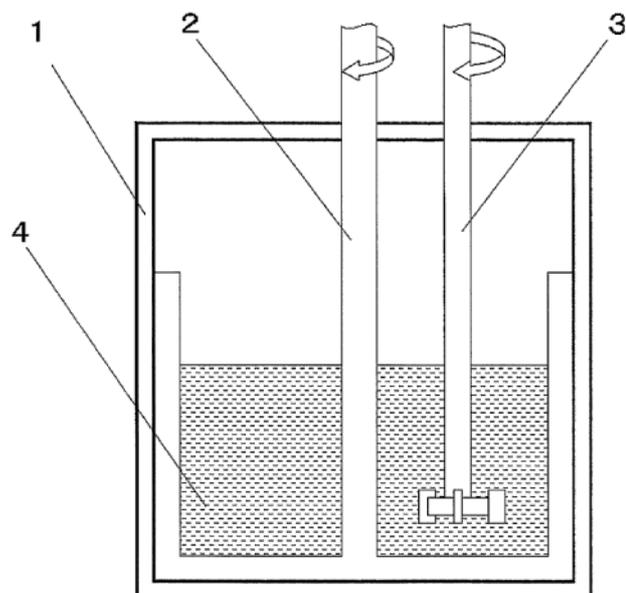
*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

WO 2011/059106

PCT/JP2010/070423

FIG. 1



## B01F 7/167

[N: the receptacle being subdivided in adjacent compartments]

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

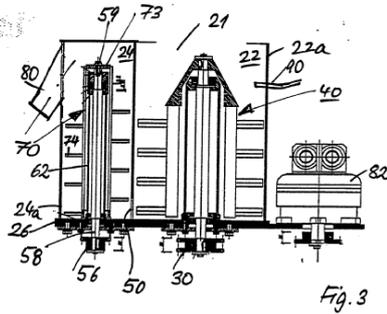


Fig. 3

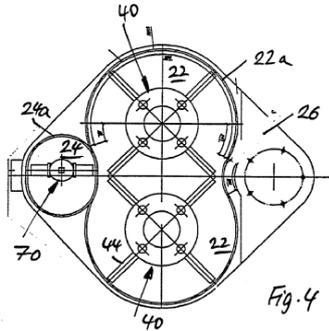


Fig. 4

## B01F 7/1675

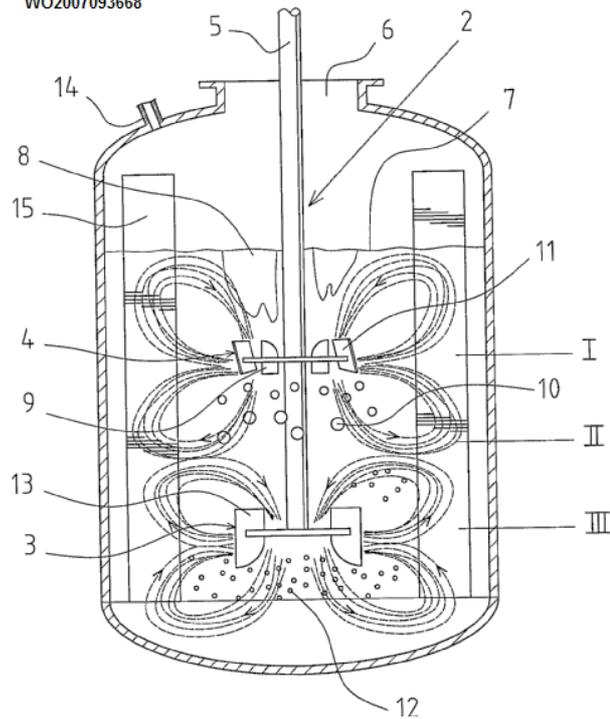
[N: co-operating with deflectors or baffles fixed to the receptacle ([B01F 7/1635](#), [B01F 7/1645](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

WO2007093668



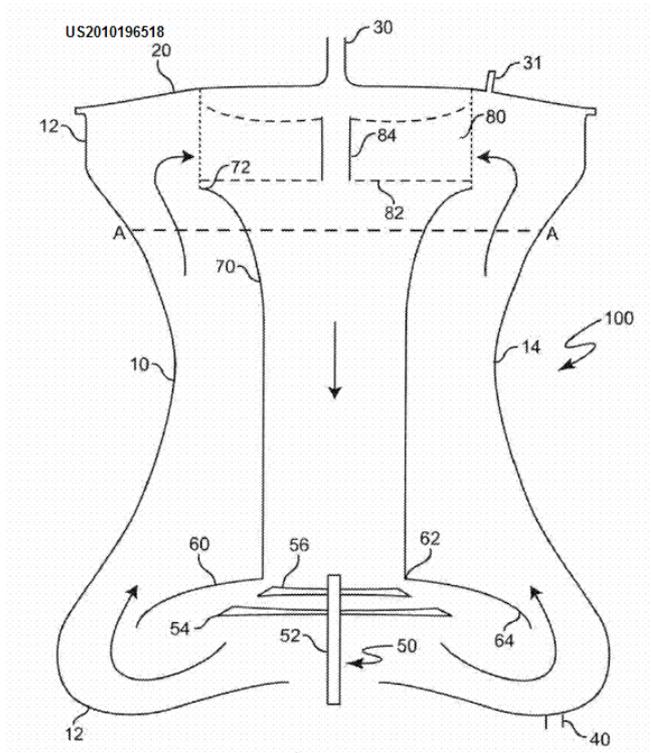
## **B01F 7/168**

**[N: the baffles being of cylindrical shape, e.g. a mixing chamber surrounding the stirrer, the baffle being displaced axially to form an interior mixing chamber]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



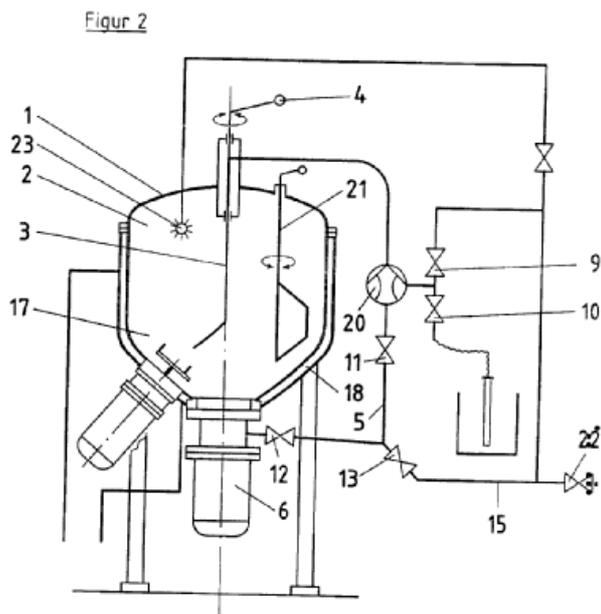
## B01F 7/1685

[N: the baffles being adjustable or movable ([B01F 7/168](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



ITE 1

Nummer:  
 Int. Cl. 7:  
 Offenlegungstag:  
 DE 102 02 084 A1  
 B 01 F 7/16  
 7. August 2003

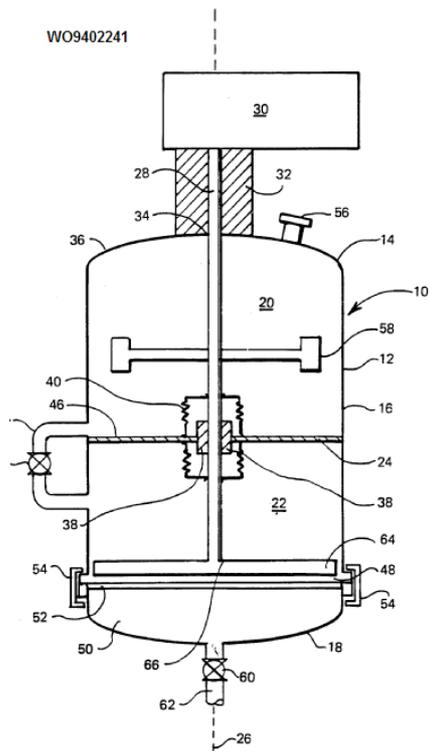
## B01F 7/169

[N: the receptacle being divided into superimposed compartments]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



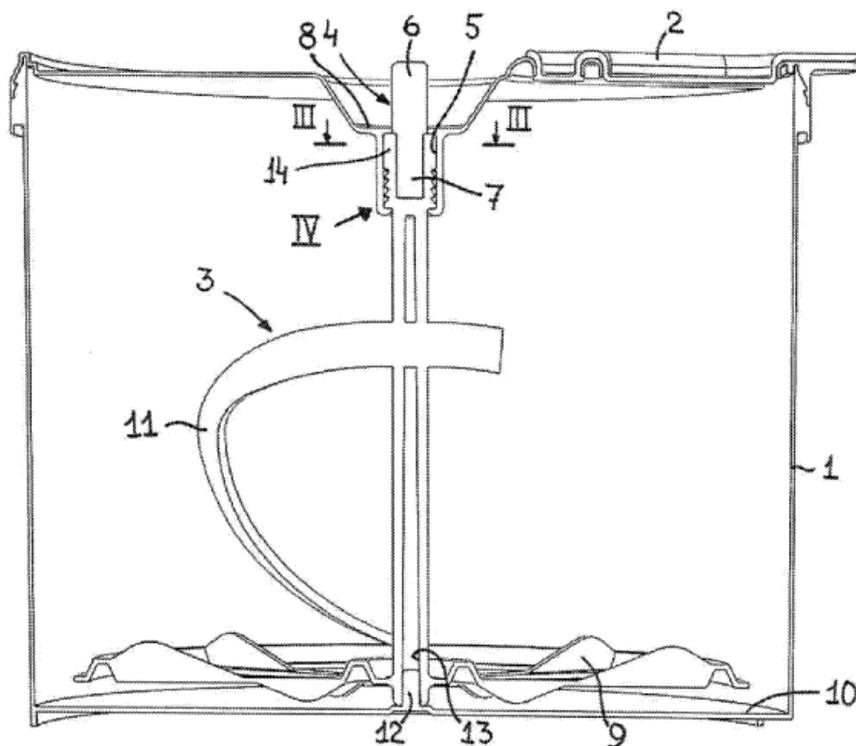
## B01F 7/1695

[N: with an independent receptacle-stirrer unit, the stirrer being adapted to be coupled to a drive mechanism]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



EP 2 260 933 A1

## B01F 9/00

Mixers with rotating receptacles, [N: i.e. the rotary motion is imparted to effect the mixing] ([N: [B01F 11/0002](#),] [B01F 13/04](#) take precedence); [N: Mixing the contents of packages or like independent containers by rotating them]

### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

Mixers combined with safety devices	<a href="#">B01F 13/04</a>
-------------------------------------	----------------------------

### Special rules of classification within this group

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

## B01F 9/0001

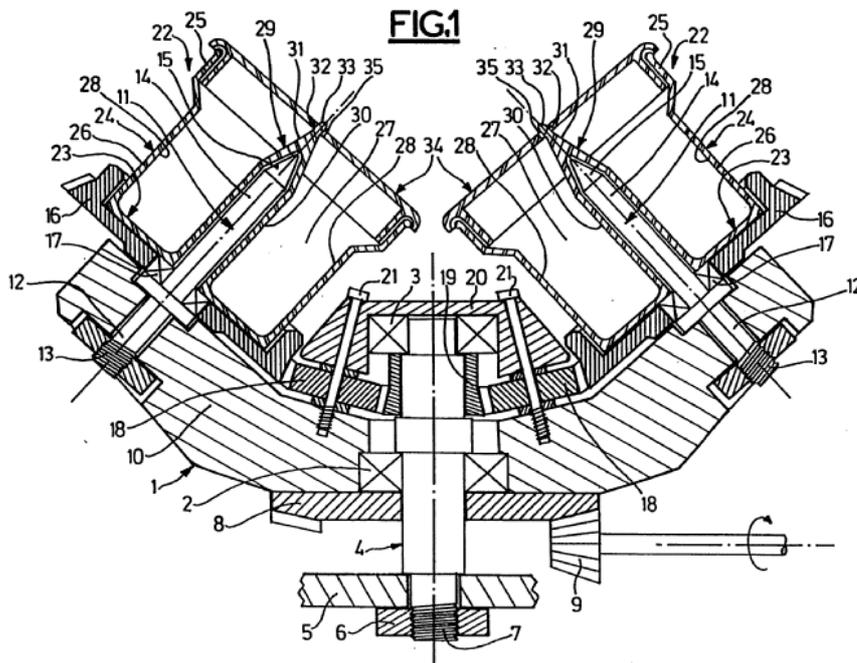
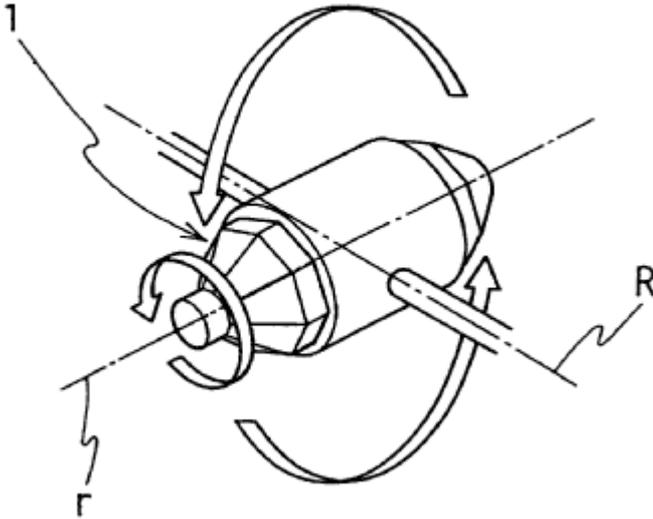
[N: the receptacles being submitted to rotation about two different axes, e.g. receptacles having planetary motion]

### Definition statement

This subclass/group covers:

Illustrative examples of subject matter classified in this group.

EP 1 024 160 A1



WO 92/06777

1/2

PCT/EP91/00817

**B01F 9/0003**

[N: Use of centrifuges for mixing]

**Definition statement**

*This subclass/group covers:*  
Centrifuges used for mixing materials.

### References relevant to classification in this group

*This subclass/group does not cover:*

Centrifuges per se	<a href="#">B04B</a>
--------------------	----------------------

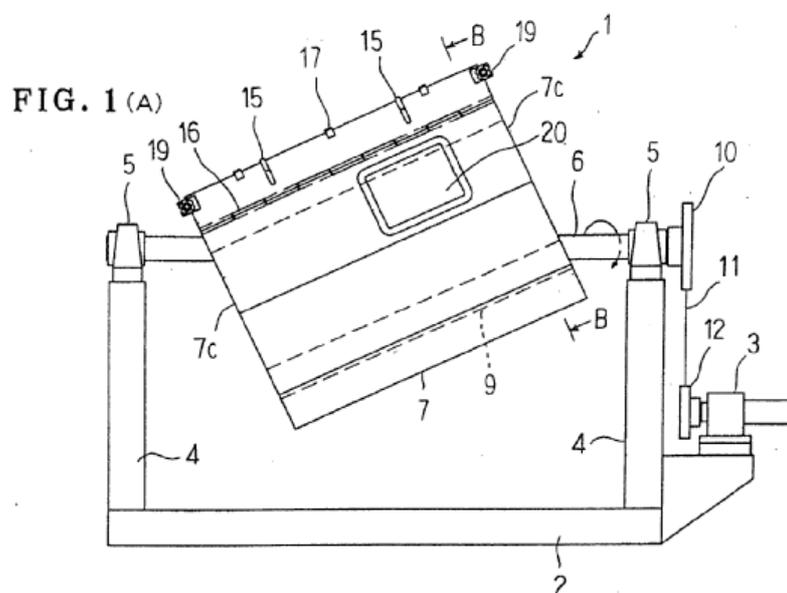
### B01F 9/0005

[N: the receptacles rotating about an axis at an angle to their longitudinal axis]

#### Definition statement

*This subclass/group covers:*  
Illustrative example of subject matter classified in this group.

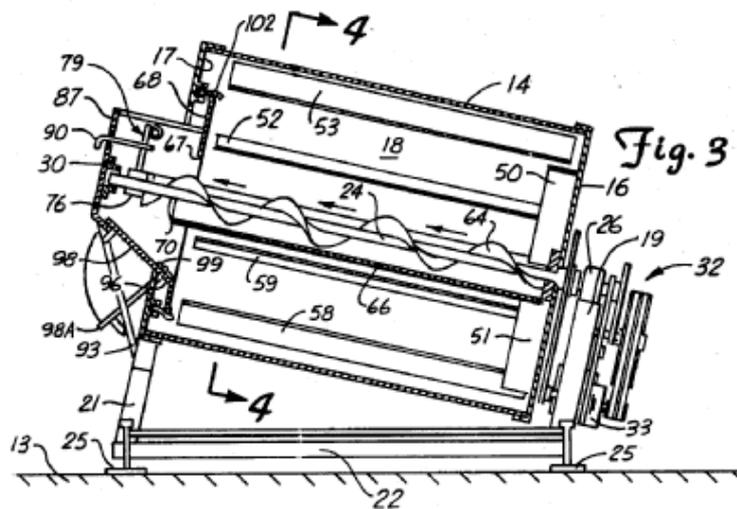
EP 1 247 563 A2



### B01F 9/0007

[N: the material flowing continuously through the receptacles from feed to discharge, e.g. the feed and discharge being at the same end]





**B01F 9/0014**

[N: Mixing the contents of packages or like independent containers, e.g. tins, bottles, by rotating them]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

March 9, 1965

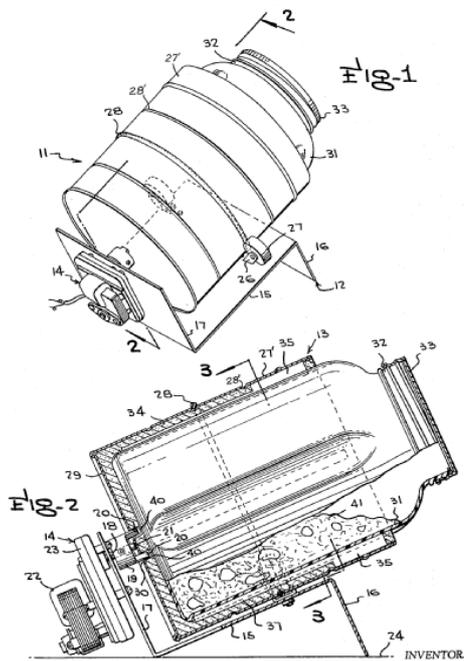
D. F. SMITH

3,172,644

ROTARY TUMBLER AND METHOD FOR MAKING SAME

Filed March 12, 1963

2 Sheets-Sheet 1



## B01F 9/0016

[N: the containers being supported by driving means, e.g. by rotating rollers]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

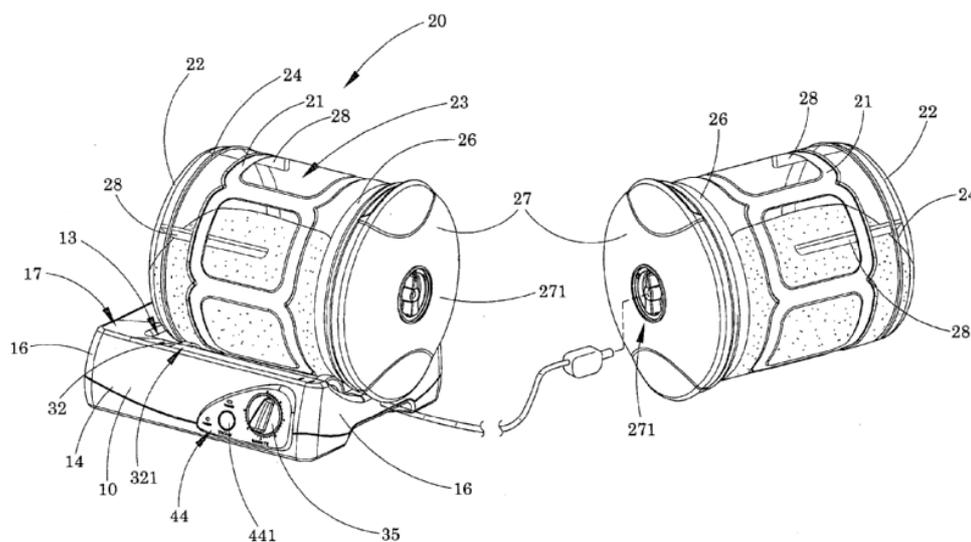


FIG. 1

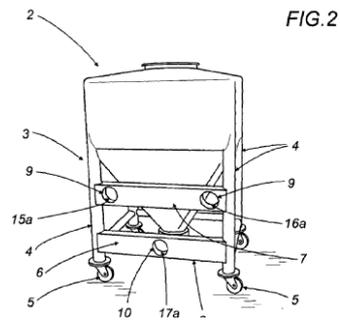
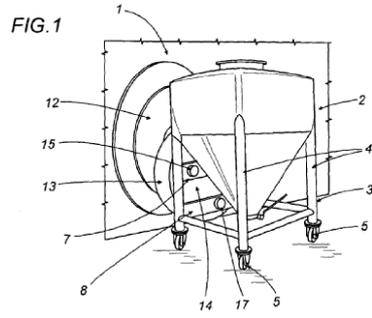
## B01F 9/0018

[N: the containers being modified for coupling to rotating frames or the like; Containers therefor; Coupling means therefor]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



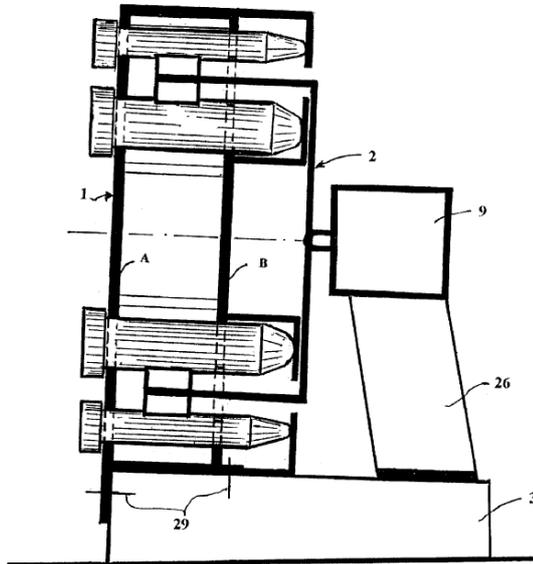
## B01F 9/002

[N: for test-tubes or like small containers, e.g. containing blood samples]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



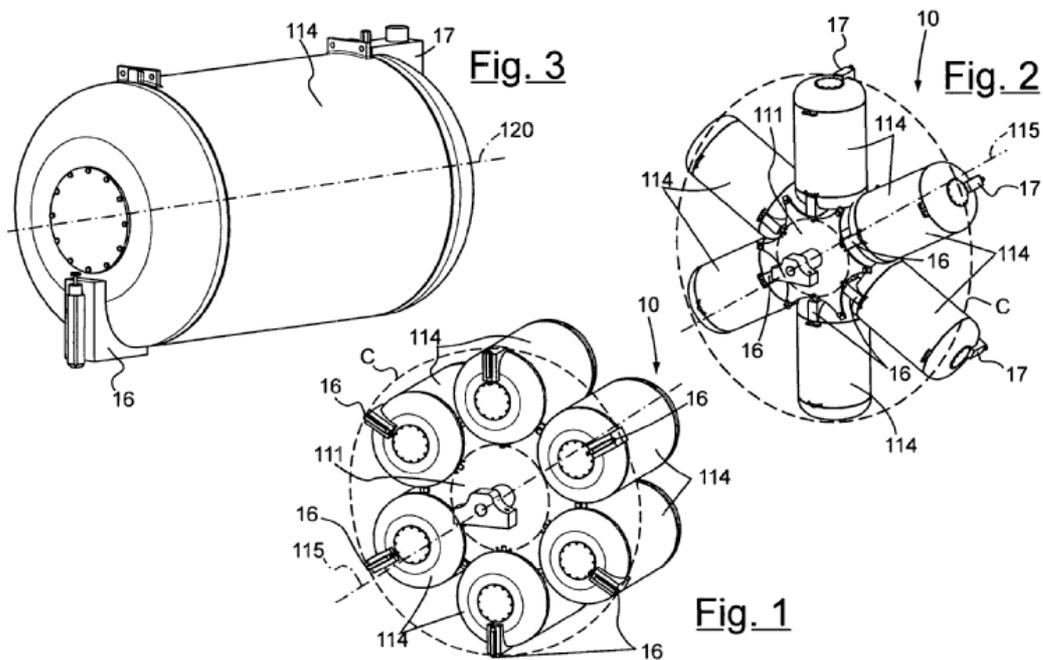
## B01F 9/0021

[N: Several containers being held in a support for simultaneous mixing, optionally with feeding and discharging means, e.g. for bottles in crates]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



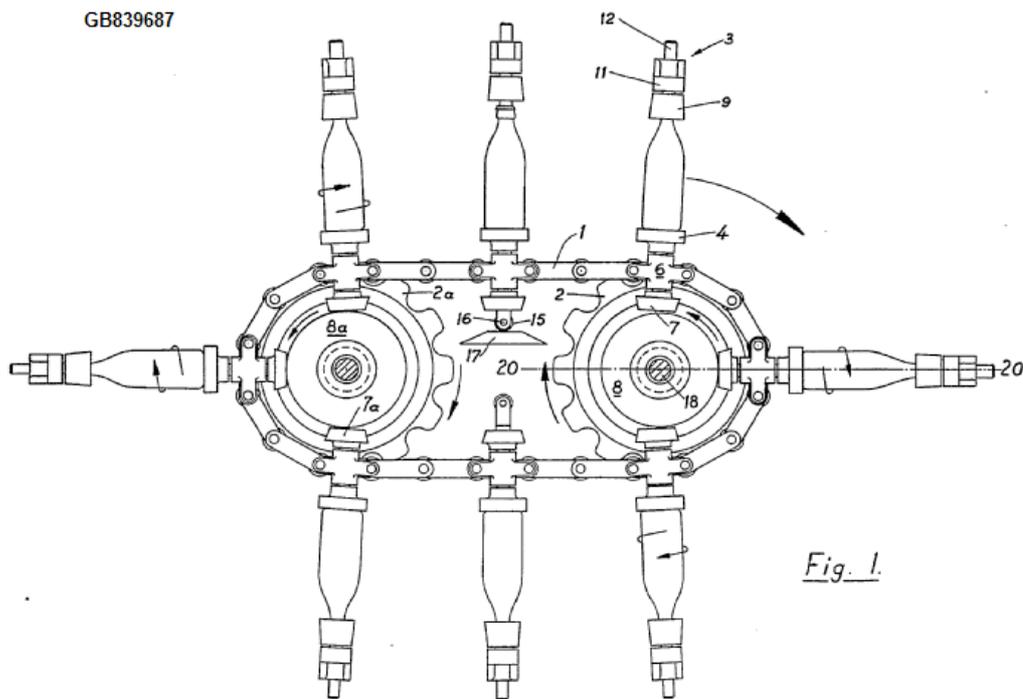
### B01F 9/0023

[N: Imparting a composite movement to a plurality of bottles]

#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 9/0025

[N: by means of a rotary table provided with a plurality of bottle grippers at its periphery, an additional movement being imparted to the grippers]

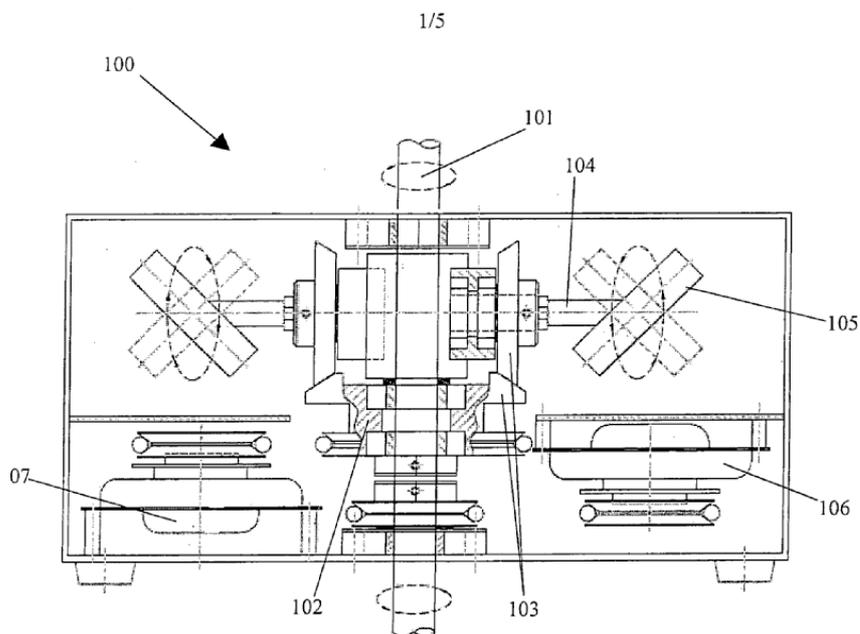
### Definition statement

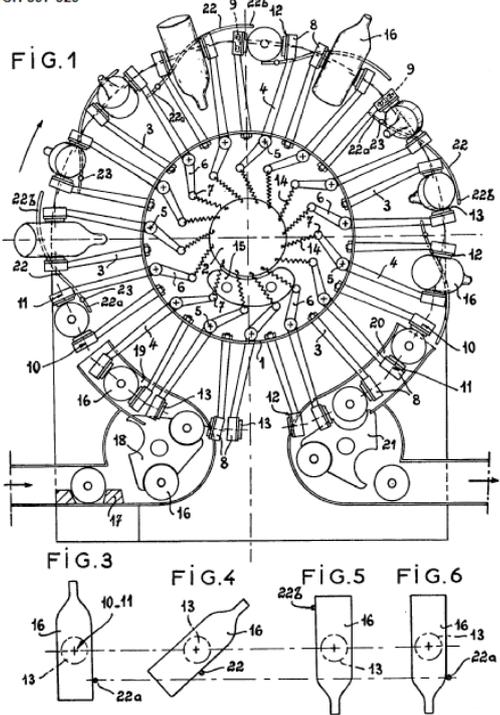
*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

WO 2009/148295

PCT/MY2008/000050





**B01F 9/0027**

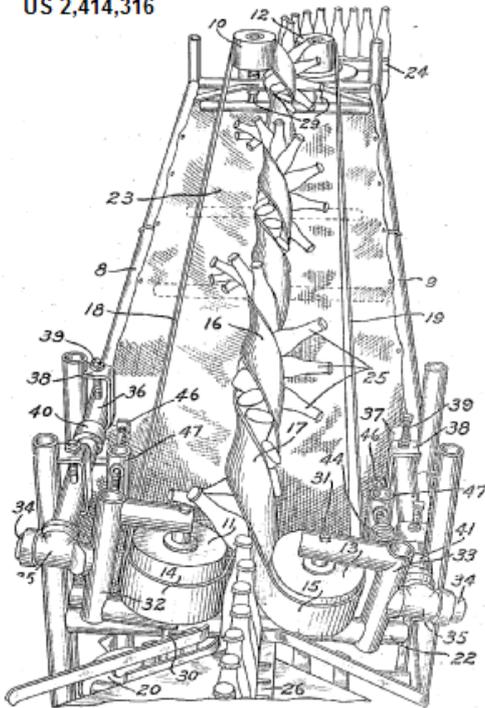
**[N: the bottles being submitted to a screw-motion about an axis perpendicular to the axis of the bottles and lying intermediate the ends of the bottles]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

US 2,414,316



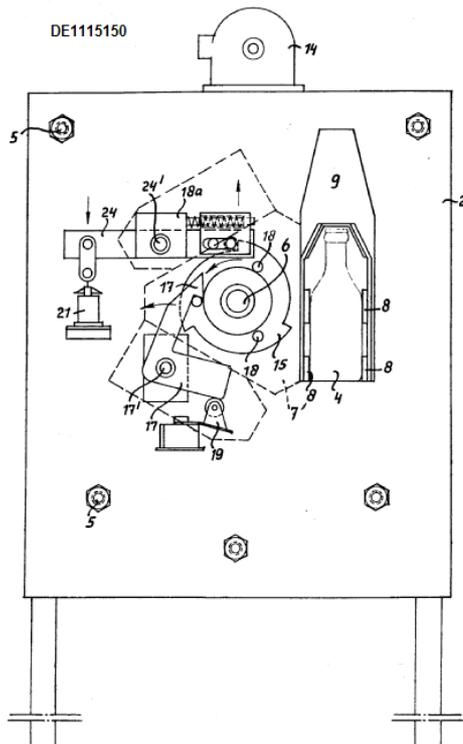
## B01F 9/0029

[N: essentially by rotating bottles about an axis perpendicular to the bottle axis and lying outside the bottles, using a rotating drum provided with pockets for the bottles at its periphery]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 9/0032

[N: Parts or components, e.g. receptacles, feeding or discharging means ([B01F 9/0009](#) takes precedence)]

### References relevant to classification in this group

*This subclass/group does not cover:*

Mixers with rotating receptacles with at least one screw inside the receptacle for feeding or discharging	<a href="#">B01F 9/0009</a>
---	-----------------------------

### Special rules of classification within this subclass/group

The holding elements for mounting the containers on the mixing device should be classified in [B01F 15/00733](#), but some documents are still classified in [B01F 9/0032](#)

## B01F 9/0034

[N: Receptacles, e.g. provided with liners]

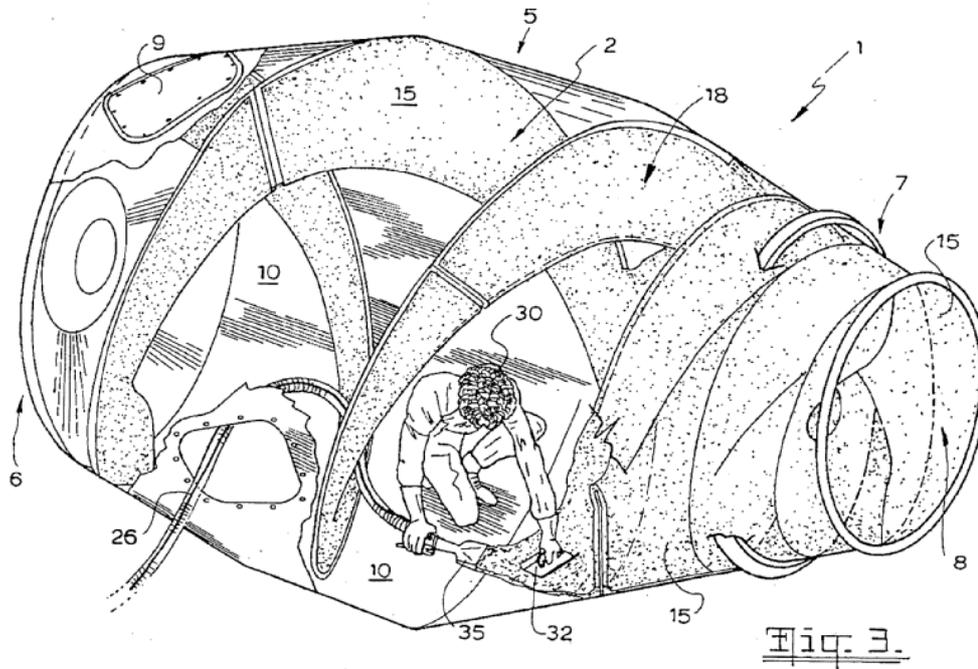
### Definition statement

*This subclass/group covers:*

Specific features of the receptacles/containers not covered by the groups [B01F 9/02](#) and [B01F 9/10](#).

Examples:

Surface characteristics:



WO 2007/137316

3/8

PCT/AU2007/000740

Geometry of the internal chamber:

WO 2006/114496

PCT/FR2006/00082

2/2

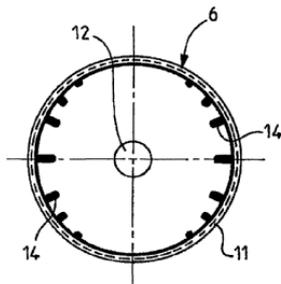


FIG. 2

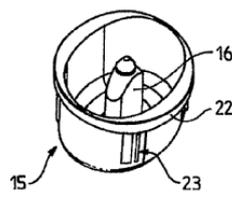
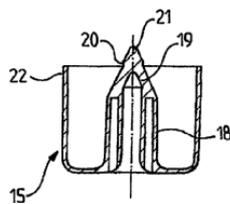
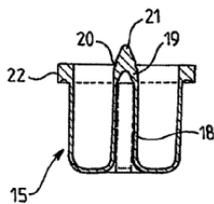
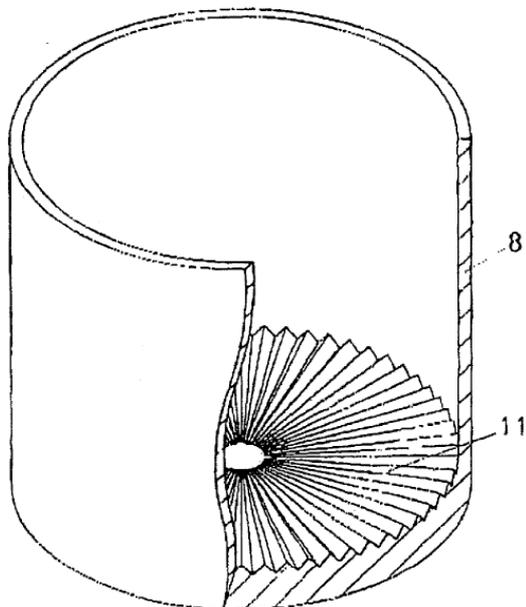


FIG. 3





## **B01F 9/0036**

**[N: characterised by the shape or cross-section of the receptacle, e.g. of Y -, Z -, S -, or X shape]**

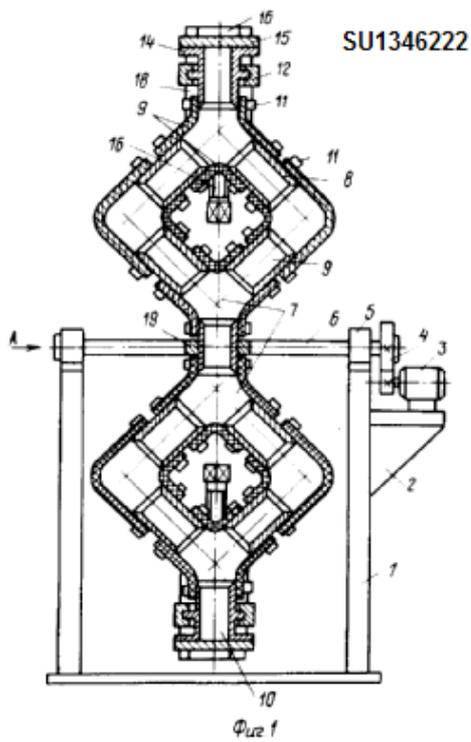
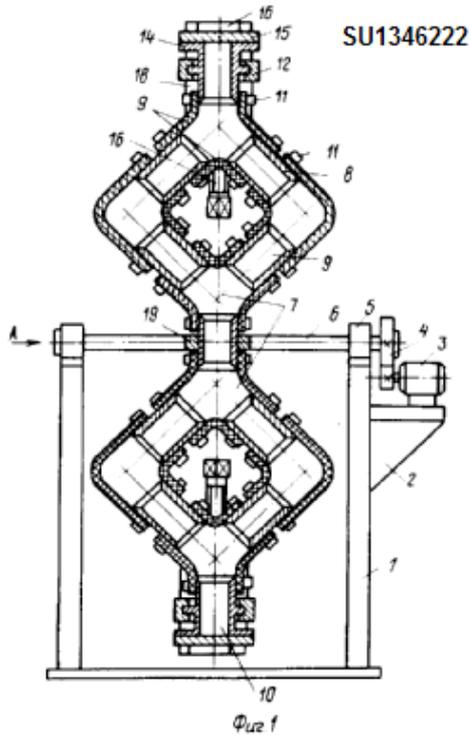
### **Definition statement**

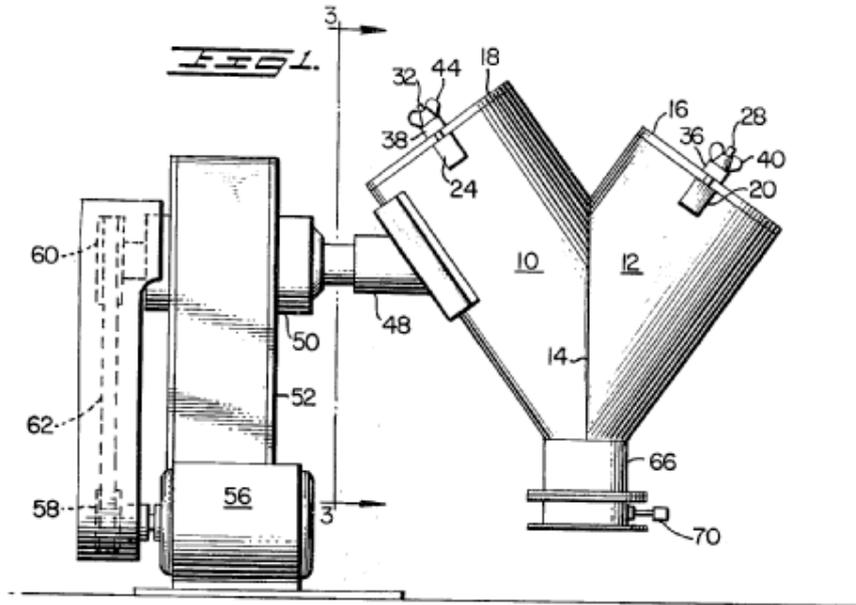
*This subclass/group covers:*

Receptacles having a special shape to enhance the mixing effect while being rotated.

Examples:







**B01F 9/02**

rotating about a horizontal or inclined axis, e.g. drum mixers

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Drum mixers for cement	<a href="#">B28C 5/18</a>
Drum mixers mounted o a vehicle for cement mixing and transport	<a href="#">B28C 5/42</a>

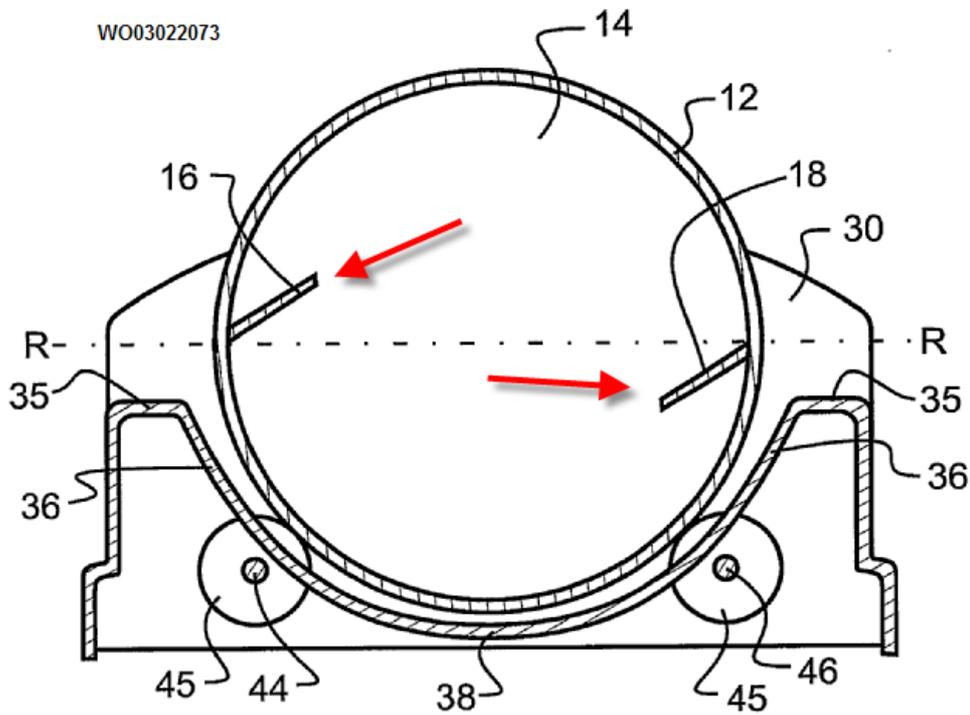
**B01F 9/06**

with fixed bars, [N: i.e. stationary, or fixed on the receptacle]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



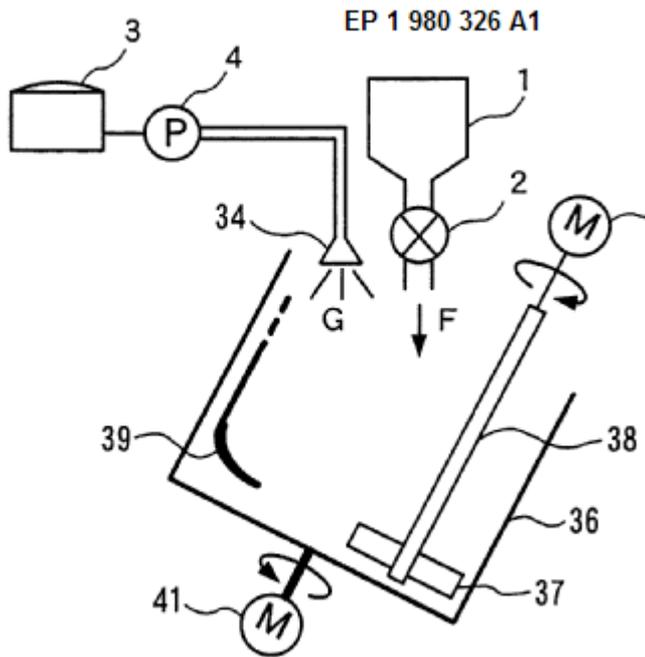
## B01F 9/08

with [N: moving, e.g.] rotating stirring devices, [N: i.e. moving with respect to the receptacle]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



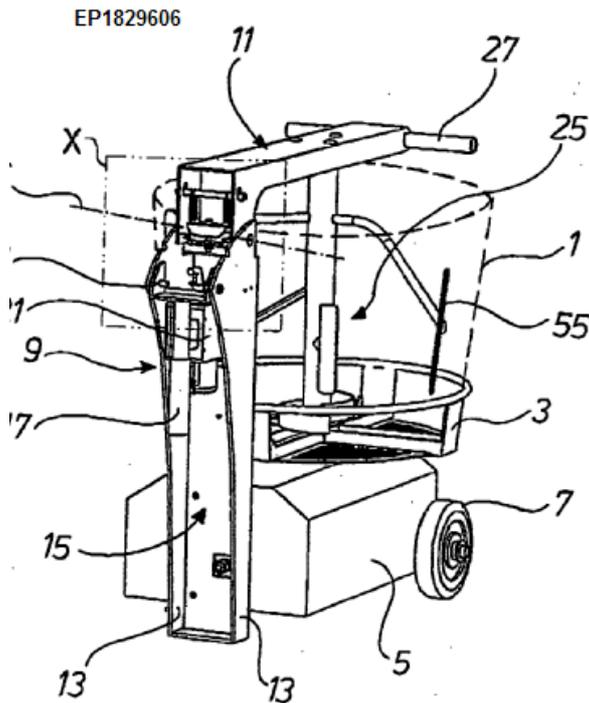
## B01F 9/103

[N: co-operating with stationary mixing elements ([B01F 9/106](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this group

*This subclass/group does not cover:*

Mixers with rotating receptacles, the receptacle comprising a rotary part	<a href="#">B01F 9/106</a>
---	----------------------------

### **B01F 9/106**

**[N: the receptacle comprising a rotary part, e.g. the bottom, and a stationary part, e.g. the wall, with optional use of a stirrer; the receptacle comprising parts moving in opposite directions]**

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Aug. 8, 1950

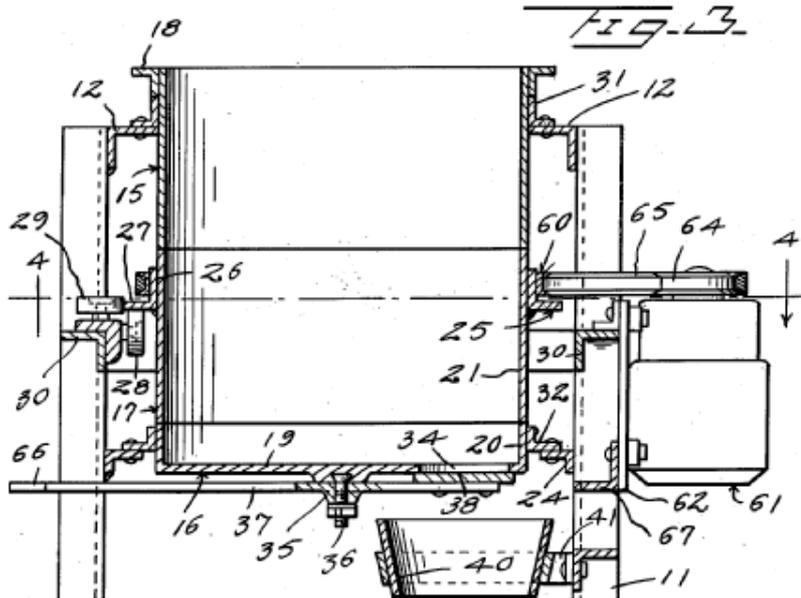
K. Z. HUSZAR

2,518,143

CYLINDRICAL ATTRITION MILL WITH ROTARY MIDSECTION

Filed June 14, 1948

3 Sheets-Sheet 2



## B01F 11/00

Mixers with shaking, oscillating, or vibrating mechanisms  
([B01F 13/04](#) takes precedence)

### Definition statement

*This subclass/group covers:*

Devices in which shaking, oscillating or vibrating movements are involved for mixing or agitating components, wherein the relevant part is the type of movement produced and the mixing effect achieved.

### References relevant to classification in this group

*This subclass/group does not cover:*

Mixers combined with safety devices	<a href="#">B01F 13/04</a>
Devices for generating or transmitting vibrations, in general. Drive units as such for generating the shaking, oscillating, or vibrating movement	<a href="#">B06B</a>
Means for damping vibrations	<a href="#">F16F</a>
Gearings	<a href="#">F16H</a>

## Special rules of classification within this group

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

### B01F 11/0002

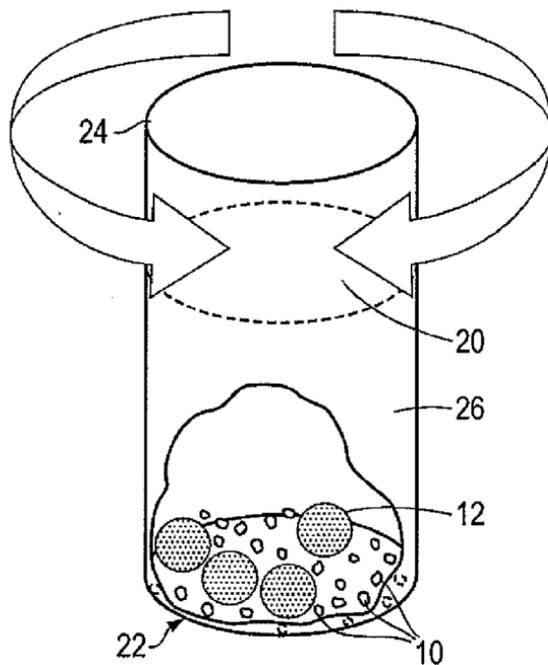
[N: with a mixing receptacle rotating alternately in opposite directions, or rotating about an axis which intersects the receptacle axis at an angle]

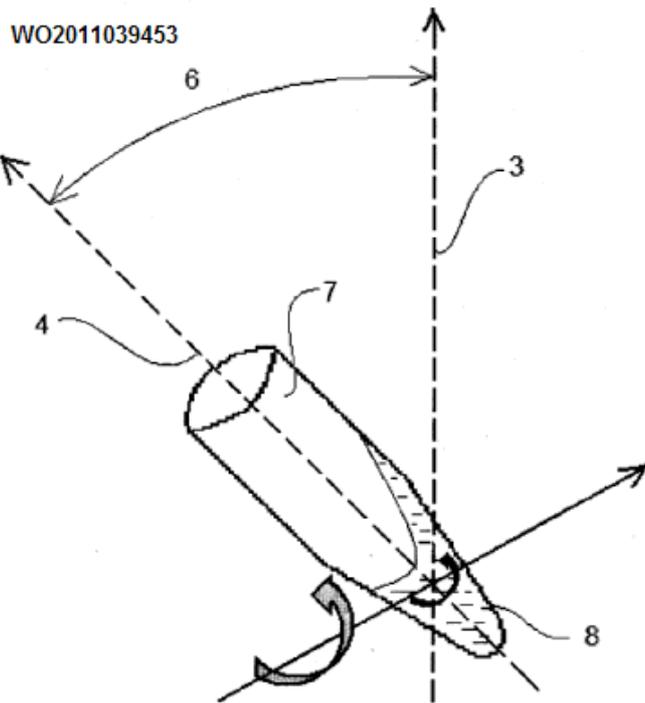
#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication Jul. 29, 2010 Sheet 1 of 2 US 2010/0189604 A1





## **B01F 11/0005**

**[N: Mixing the contents of independent containers, e.g. test-tubes, by shaking or oscillating them]**

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

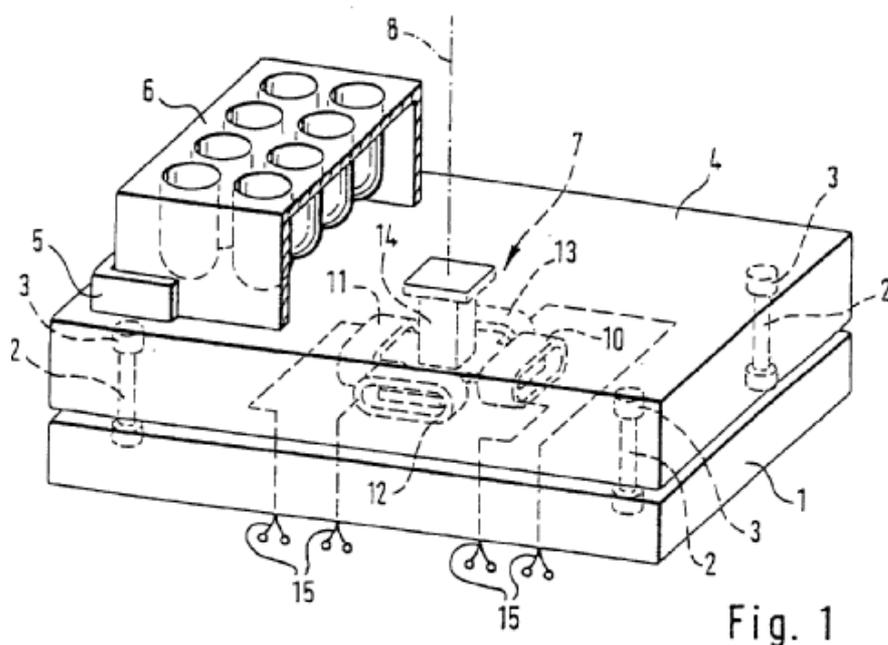


Fig. 1

## B01F 11/0008

[N: Holders therefor]

### Special rules of classification within this subclass/group

The holding elements for mounting the containers on the mixing device should be classified in [B01F 15/00733](#), but some documents are still classified in [B01F 9/0032](#).

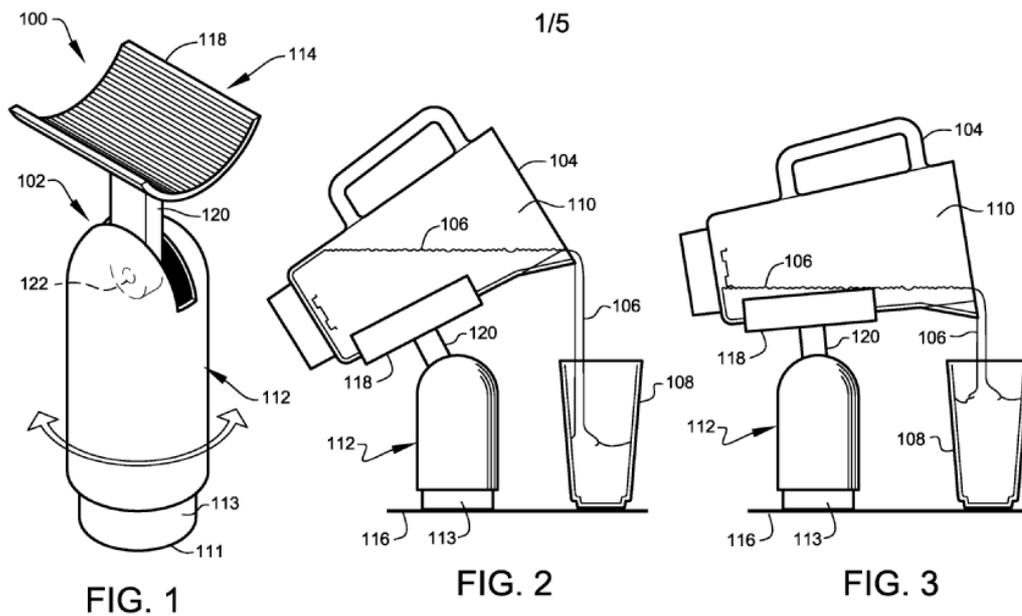
## B01F 11/0011

[N: for beverage bottles, e.g. within crates or with feeding means for the bottles]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



1/5

W/O 2007/092615  
PCT/US2007/062745

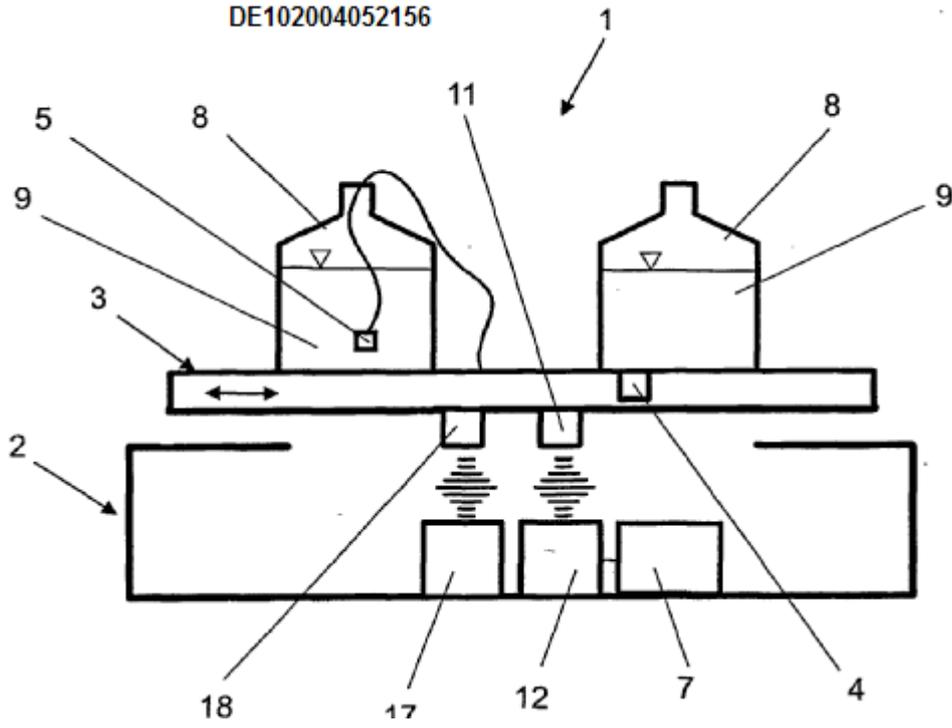
**B01F 11/0014**

[N: with supporting means moving in a horizontal plane, e.g. describing an orbital path for moving the containers about an axis which intersects the receptacle axis at an angle ([B01F 11/0017](#), [B01F 11/0022](#), [B01F 11/0031](#), [B01F 11/0034](#) take precedence)]

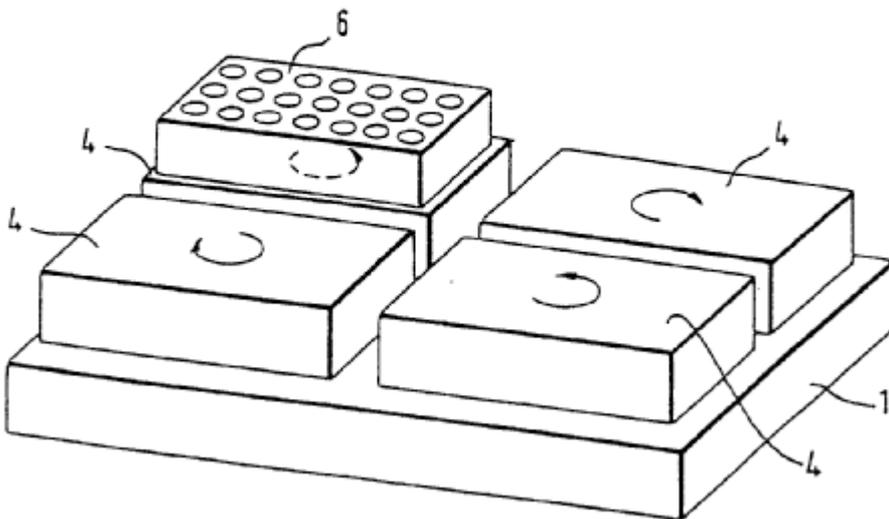
**Definition statement**

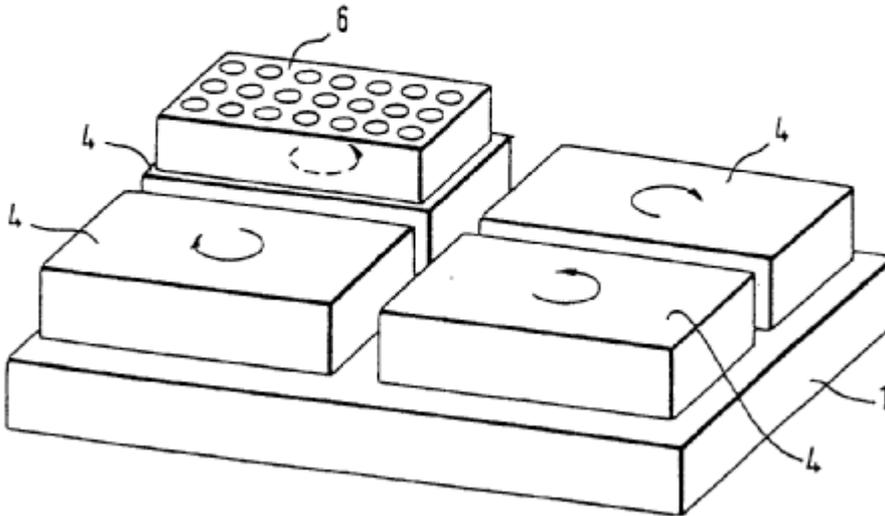
*This subclass/group covers:*  
Illustrative examples of subject matter classified in this group.

DE102004052156



EP 1 201 297 A1





**References relevant to classification in this group**

*This subclass/group does not cover:*

By pivoting the containers about an axis	<a href="#">B01F 11/0017</a>
The containers being submitted to a rectilinear movement	<a href="#">B01F 11/0022</a>
The vibrations being caused by an unbalanced rotating member	<a href="#">B01F 11/0031</a>
The vibrations being caused by electromagnets	<a href="#">B01F 11/0034</a>

**B01F 11/0017**

[N: by pivoting the containers about an axis ([B01F 11/0025](#), [B01F 11/0031](#), [B01F 11/0034](#) take precedence)]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

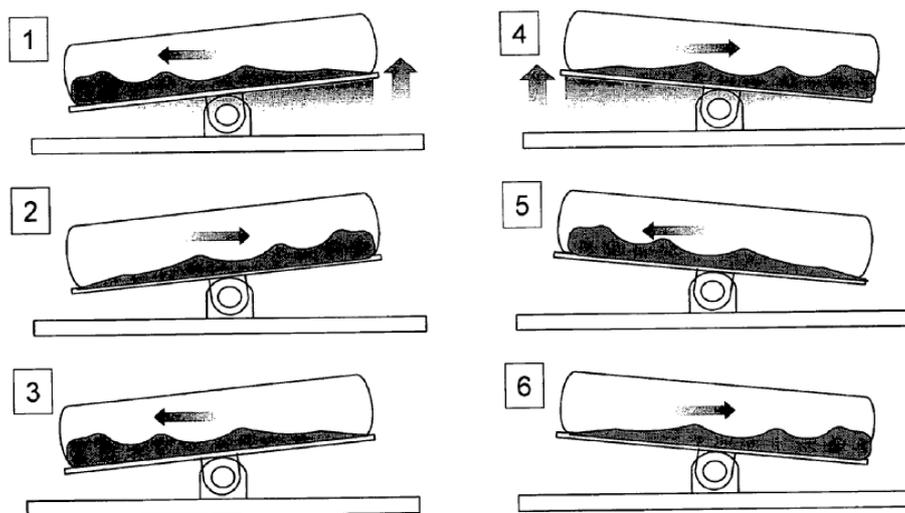


Figure 2

### References relevant to classification in this group

*This subclass/group does not cover:*

The containers being submitted to a composite movement not in a horizontal plane, e.g. rectilinear and pivoting	<a href="#">B01F 11/0025</a>
The vibrations being caused by an unbalanced rotating member	<a href="#">B01F 11/0031</a>
The vibrations being caused by electromagnets	<a href="#">B01F 11/0034</a>

### **B01F 11/0028**

**[N: the containers being submitted to a wobbling movement]**

#### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

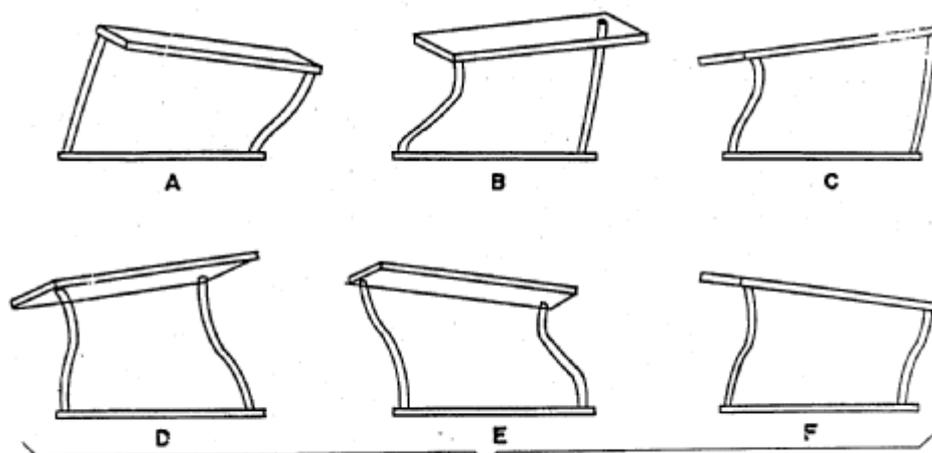


FIG.4

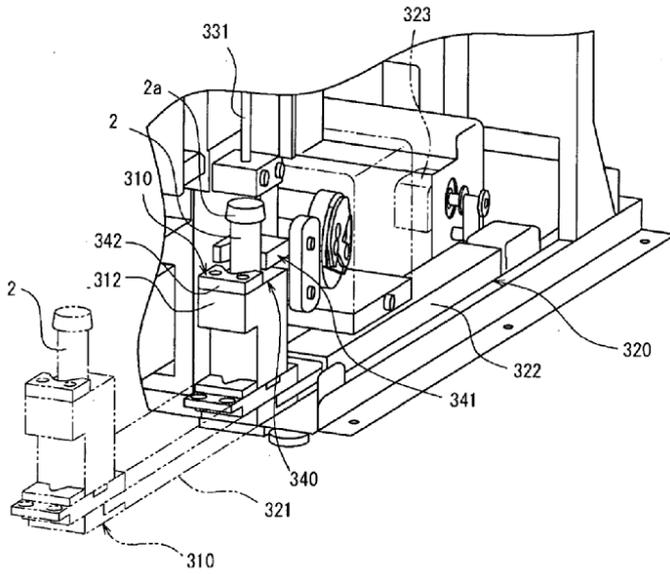
**B01F 11/0037**

[N: with means for transporting test tubes to and from the stirring device]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



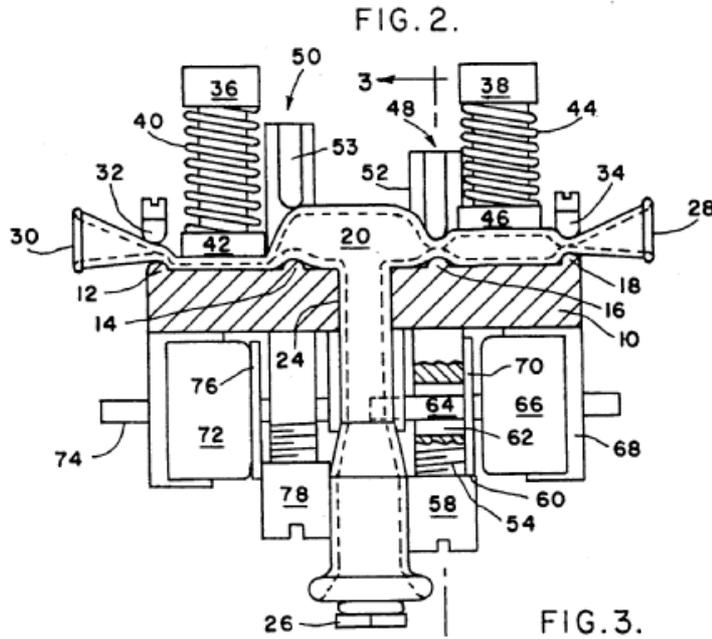
## B01F 11/0042

[N: Comprising a receptacle to only a part of which the movement is imparted; Periodically deforming flexible tubular members through which the material is flowing]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



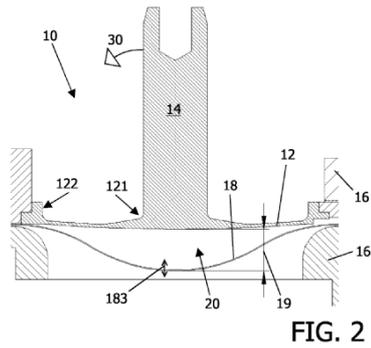
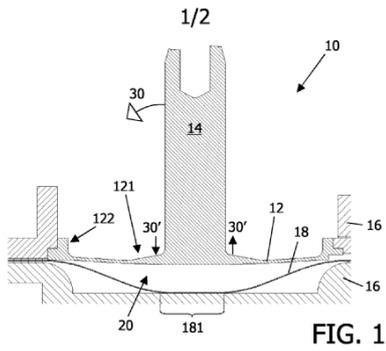
**B01F 11/0045**

[N: comprising a receptacle with a deformable part, e.g. a membrane, to which a motion is imparted]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 11/0054

[N: having a rotary stirrer oscillating axially (having rotary stirrers with additional radial movement, or oscillating about an axis perpendicular to the stirrer axis, [B01F 7/1655](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

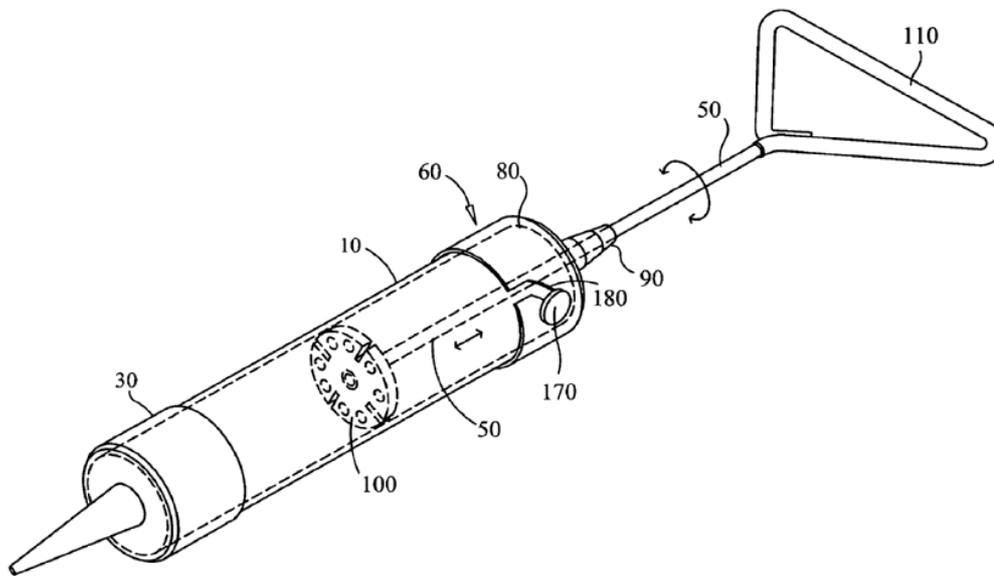


FIG. 5

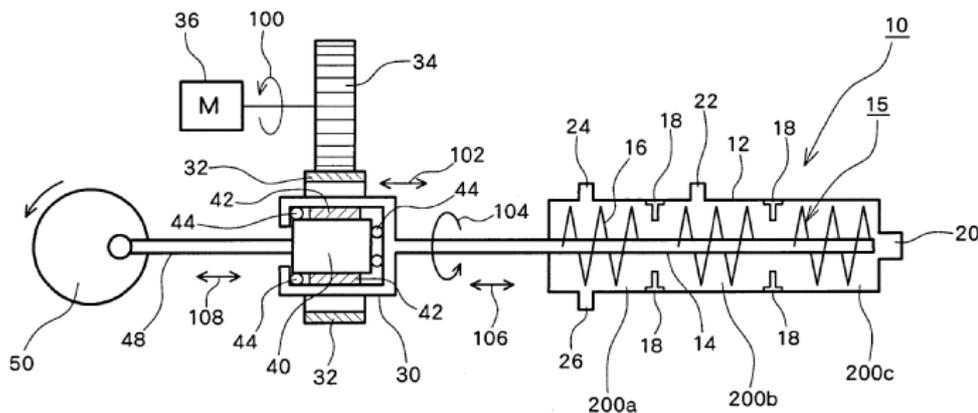
**B01F 11/0057**

[N: for material flowing continuously axially therethrough]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



**B01F 11/006**

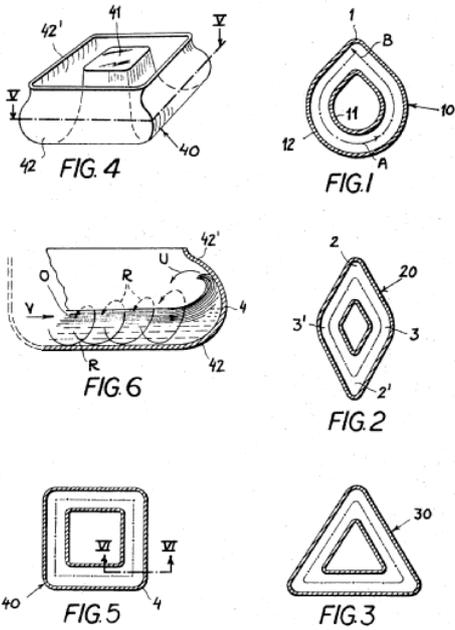
[N: having an annular trough vibrating about its central axis]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Feb. 25, 1969 E. HUBER 3,429,560  
DEVICE FOR MIXING OR SURFACE-TREATING FLOWABLE GOODS  
Filed Nov. 28, 1967 Sheet 1 of 3



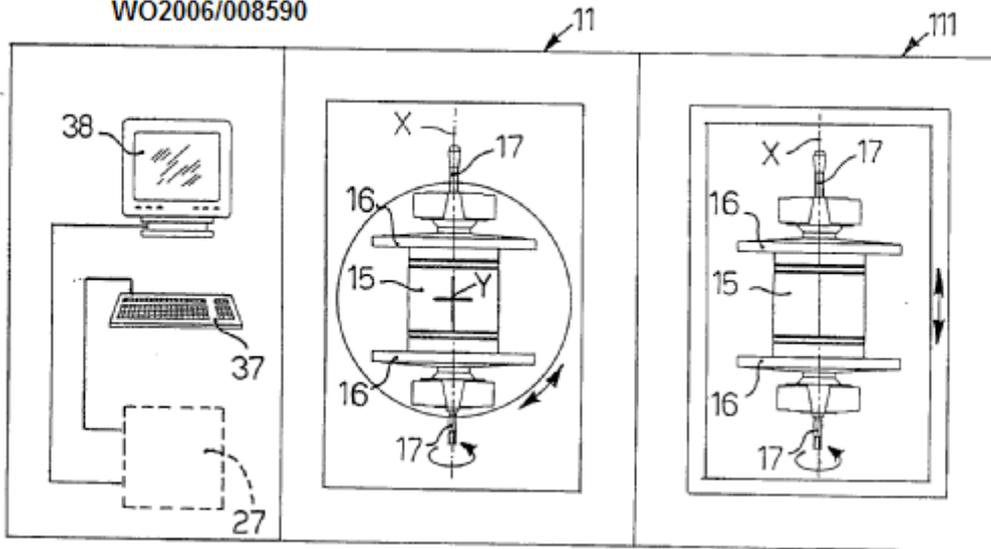
## B01F 11/0062

[N: having a receptacle submitted to a composite movement, i.e. at least one movement being vibratory or oscillatory]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



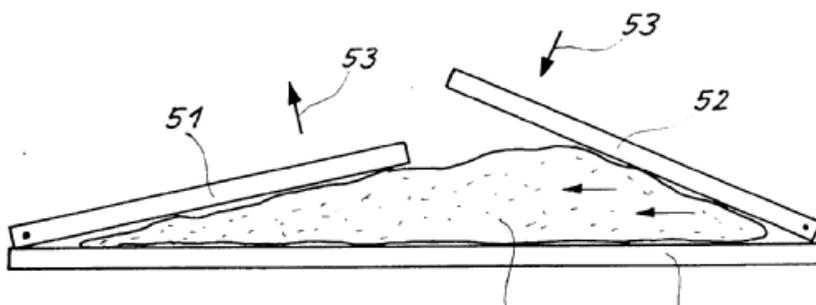
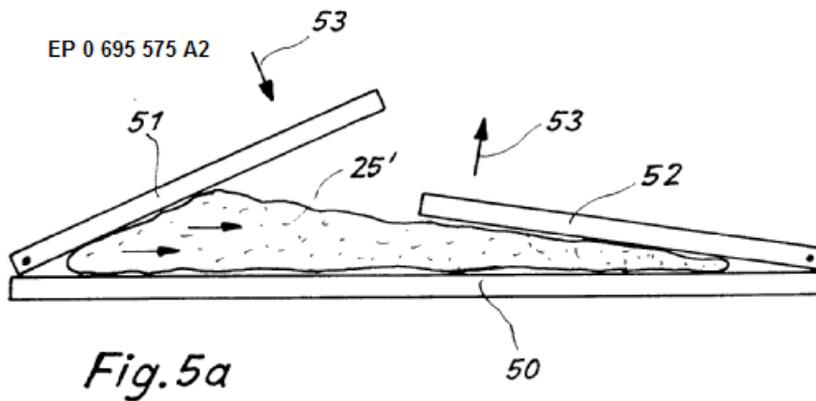
**B01F 11/0065**

[N: the material being contained in a flexible bag submitted to periodical deformation]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 11/0071

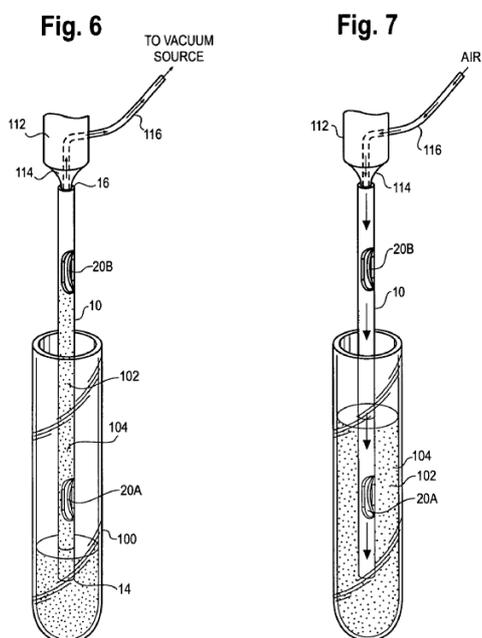
[N: the material being directly submitted to a pulsating movement, e.g. by means of an oscillating piston or air column (solvent extraction of liquid solution comprising vibrating mechanisms [B01D 11/0438](#); stationary reactors of pulsating type [B01J 19/185](#))]

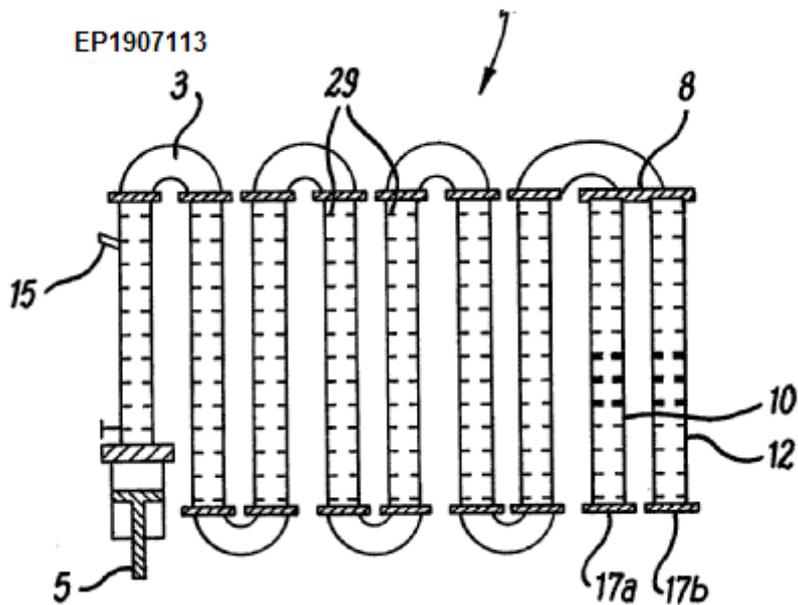
### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

Patent Application Publication Feb. 25, 2010 Sheet 3 of 3 US 2010/0047898 A1





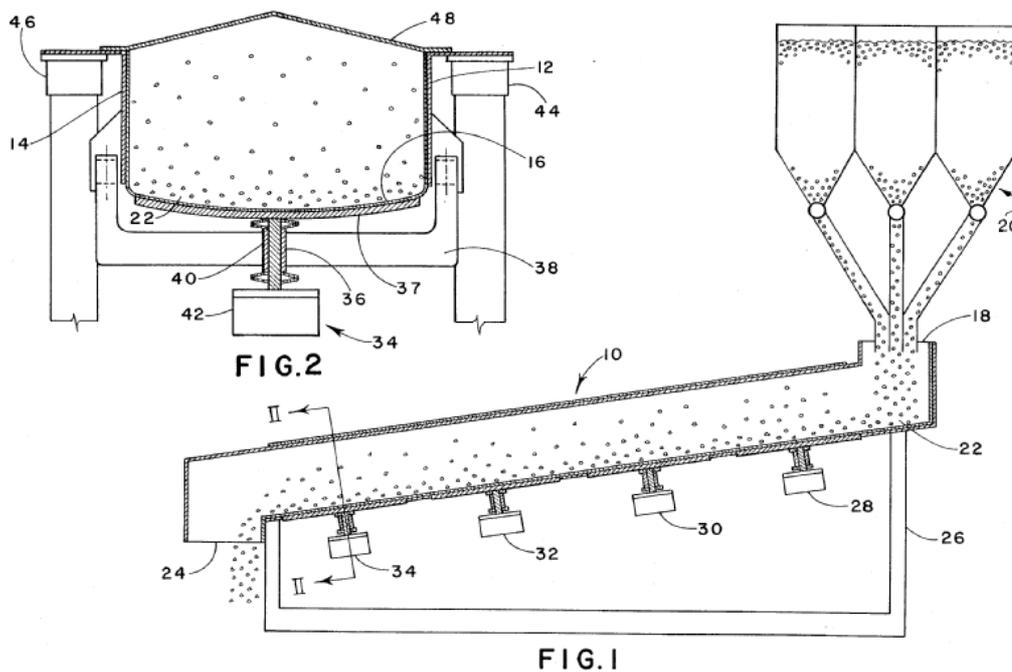
**B01F 11/0077**

[N: for material continuously moving therethrough ([B01F 11/0042](#), [B01F 11/0057](#), [B01F 11/006](#), [B01F 11/0241](#) take precedence)]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



U.S. Patent  
Jan. 15, 1985  
4,493,556

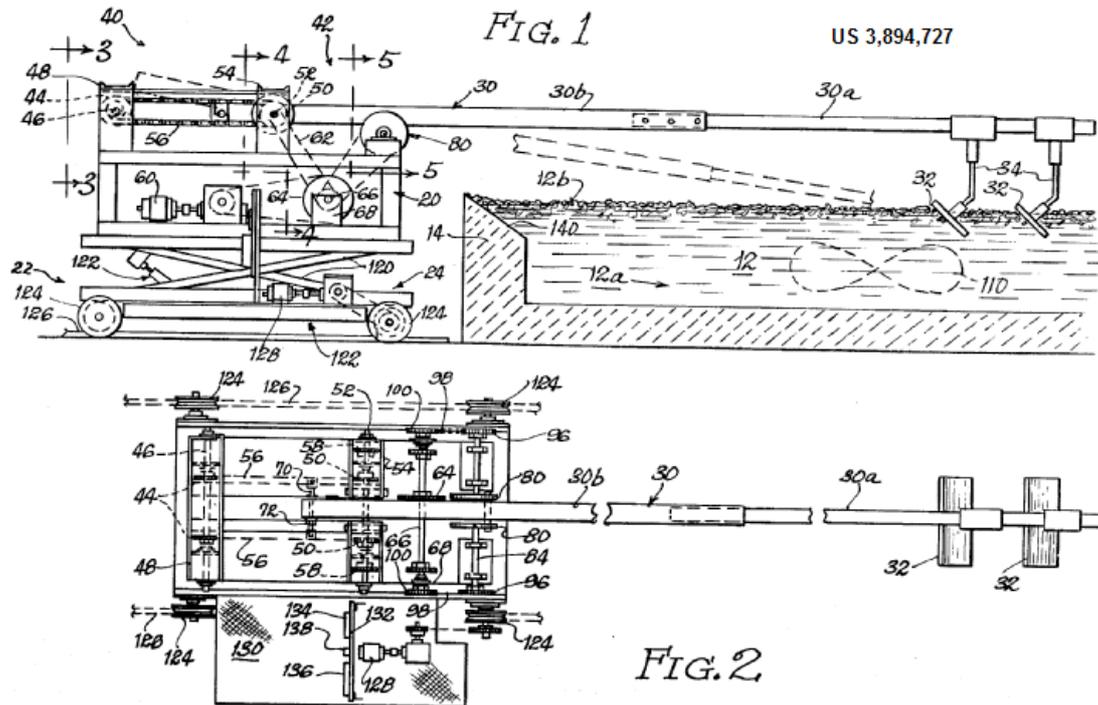
## B01F 11/008

[N: the stirrers performing an oscillatory, vibratory or shaking movement ([B01F 11/0054](#), [B01F 11/04](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### References relevant to classification in this group

*This subclass/group does not cover:*

Mixers with pendulum stirrers	<a href="#">B01F 11/04</a>
-------------------------------	----------------------------

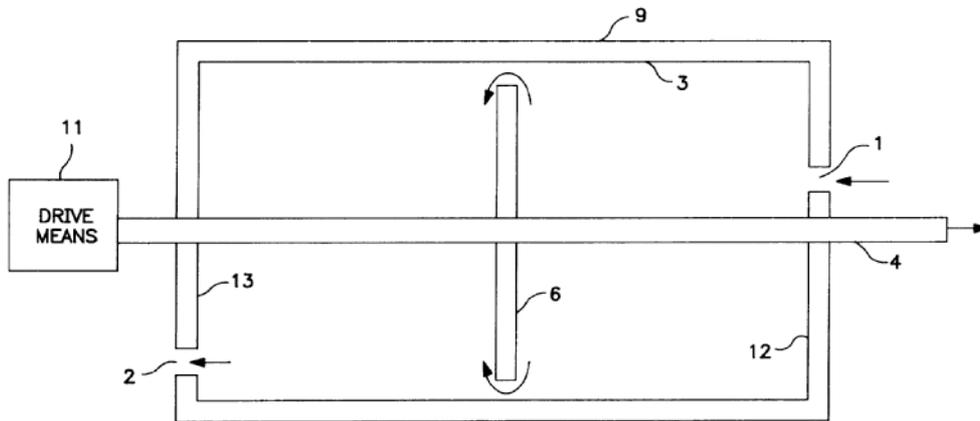
## B01F 11/0082

[N: performing a rectilinear reciprocating movement]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



EP 0 813 900 A1

FIG. 1

**B01F 11/0085**

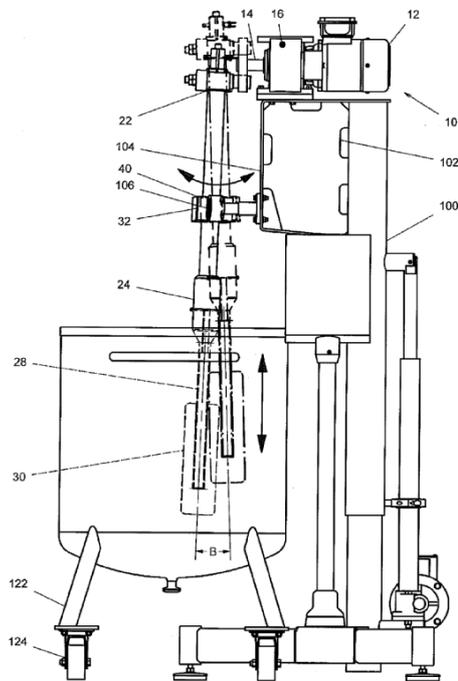
[N: performing a superposed additional movement other than oscillation, vibration or shaking]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

Patent Application Publication Apr. 22, 2010 Sheet 4 of 5 US 2010/0097882 A1



**B01F 11/0088**

**[N: performing an oscillatory movement about an axis]**

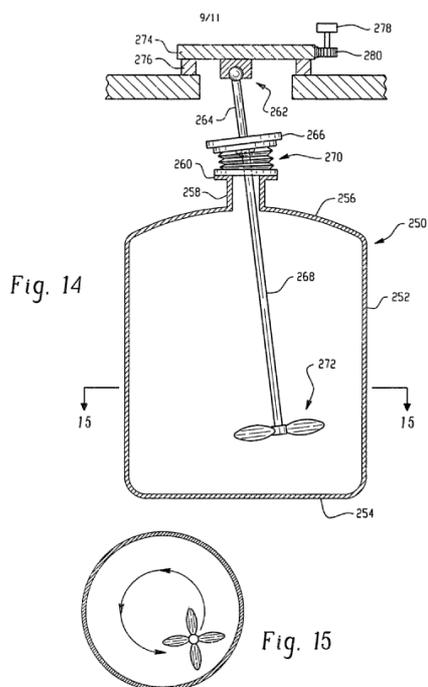
**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

WO 02/094422

PCT/US02/15555



**B01F 11/0097**

**[N: Drives therefor, e.g. crank mechanisms (B01F11/00C2 takes precedence)]**

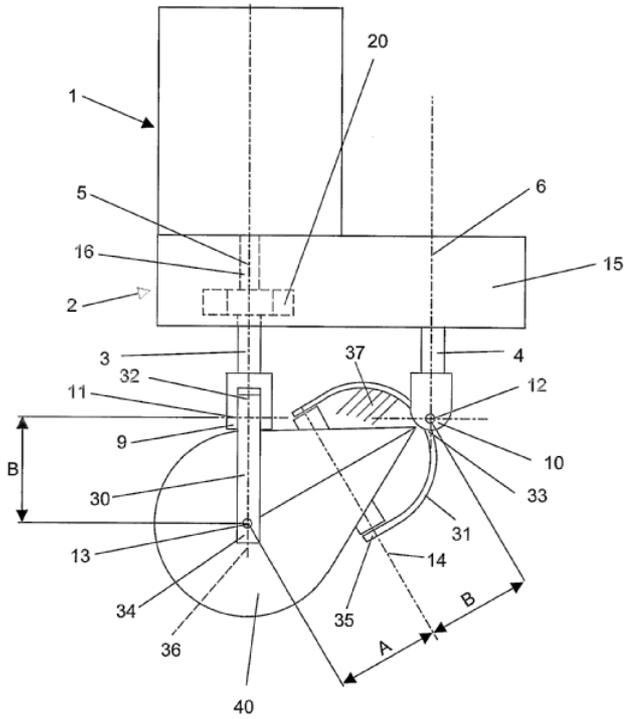
**References relevant to classification in this group**

*This subclass/group does not cover:*

Devices for generating or transmitting vibrations, in general. Drive units as such for generating the shaking, oscillating, or vibrating movement.	<a href="#">B06B</a>
Gearings	<a href="#">F16H</a>

**Special rules of classification within this group**

This type of stirrers are included here:



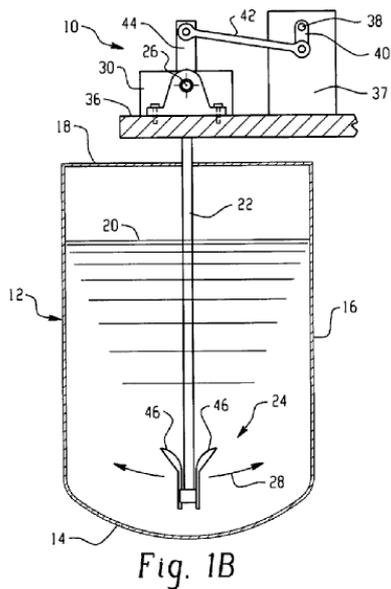
## B01F 11/04

with pendulum stirrers, [N: i.e. with stirrers suspended so as to oscillate about fixed points or axes (stirrers per se [B01F 11/0091](#))]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 13/00

**Other mixers; Mixing plant, including combinations of [N: mixers, e.g. of] dissimilar mixers**

### Special rules of classification within this group

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

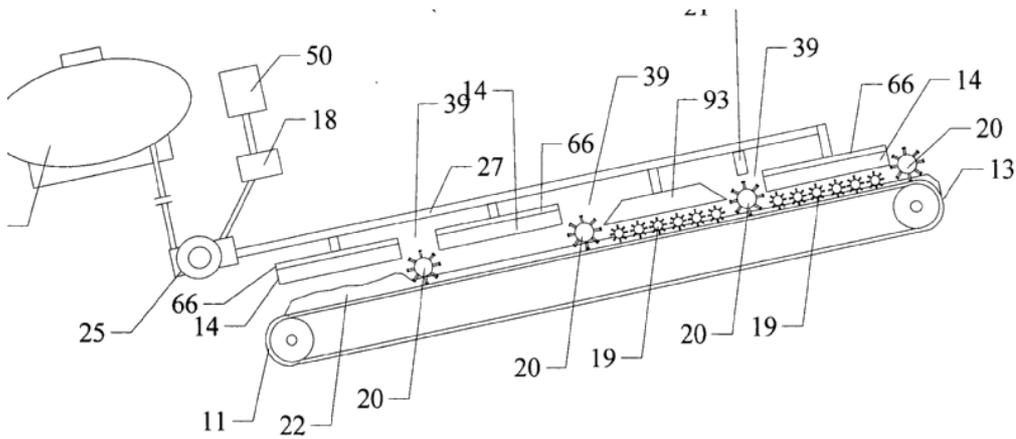
## B01F 13/0013

**[N: Mixers with an endless belt for transport of the material, e.g. in layers or with mixing means above or at the end of the belt]**

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



US 2011/0129296 A1

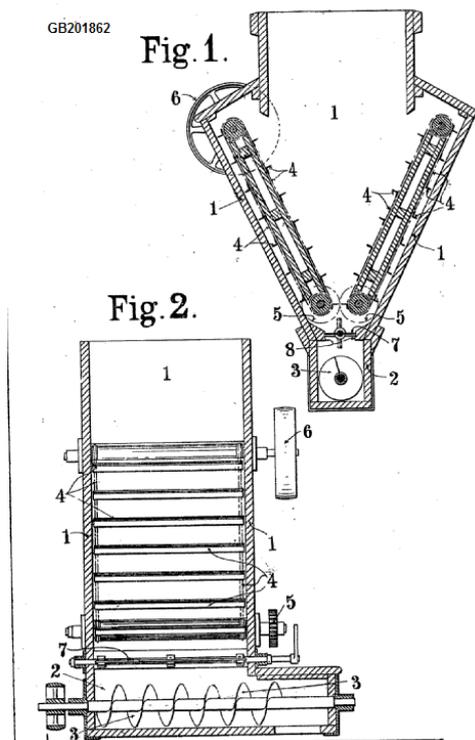
### B01F 13/0015

[N: Mixers having moving endless chains or belts, e.g. provided with paddles, as mixing elements]

#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



### B01F 13/0016

[N: Movable or transportable mixing devices or plants]

### Definition statement

*This subclass/group covers:*

Mixing devices or plants which are designed to be transported or moved from one place to another, or that during operation can be held or displaced.

### B01F 13/0018

[N: Movable mixing devices, i.e. apt to be shifted or displaced from one place to another, e.g. by human force]

### Definition statement

*This subclass/group covers:*

Mixing devices which can be displaced from one place to another, but which, during use, it remains on a supporting structure (e.g. a dough mixer which can be displaced but, during use, remains on a baking table).

### B01F 13/002

[N: portable during use, e.g. hand-held ([B05C 17/00553](#) takes precedence, whisks comprising mixing wires [A47J 43/1087](#))]

### Definition statement

*This subclass/group covers:*

Mixing devices which, during use, is held by the user, e.g. mixing syringes, paint mixers held and operated by a person.

### References relevant to classification in this group

*This subclass/group does not cover:*

Hand tools or apparatus using hand held tools with means allowing the stock of material to consist of at least two different components	<a href="#">B05C 17/00553</a>
---	-------------------------------

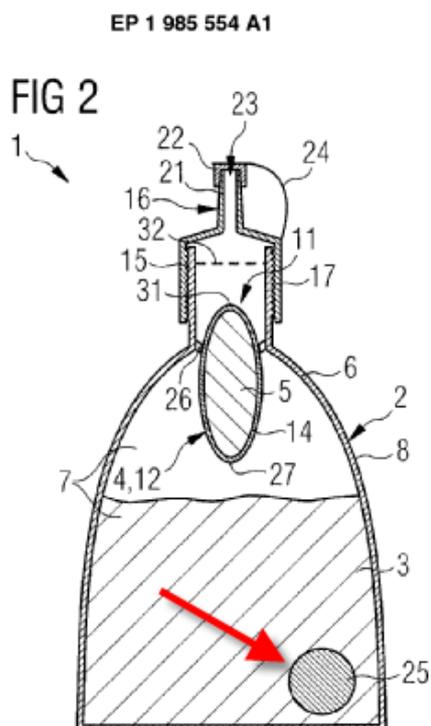
### B01F 13/005

[N: Mixers with loose mixing elements, e.g. balls, in a receptacle]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 13/0059

[N: Micromixers]

### Definition statement

*This subclass/group covers:*

Microdevices used for mixing or agitating components. Micromixers used in other type of microdevice (e.g. in a Lab-on-a-chip).

### References relevant to classification in this group

*This subclass/group does not cover:*

Microreactors	<a href="#">B01J 19/0093</a>
Microdevices used in laboratory apparatus	<b>B01L3/00C6M</b>
Micro-structural devices per se	<a href="#">B81B</a>
Apparatus and methods for manufacturing microdevices	<a href="#">B81C</a>
Micropumps	<a href="#">F04B 19/006</a>

Microvalves	<a href="#">F16K 99/0001</a>
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## Informative references

Attention is drawn to the following places, which may be of interest for search:

Microdevices used in laboratory apparatus	<b>B01L3/00C6M</b>
Microreactors	<a href="#">B01J 19/0093</a>

## Special rules of classification within this group

The classification of micromixers is done in the following way:

If the way of mixing is already covered by any of the mixing techniques covered by the rest of the groups of [B01F](#), the document is classified both in [B01F 13/0059](#) (or subgroups) and in the subgroups representing the mixing technique (e.g. flow mixing, rotating stirrer, mixing using vibrating mechanisms, etc.).

If the way of mixing is exclusive for microdevices, then the document is accordingly classified in [B01F 13/0074](#) (or subgroups).

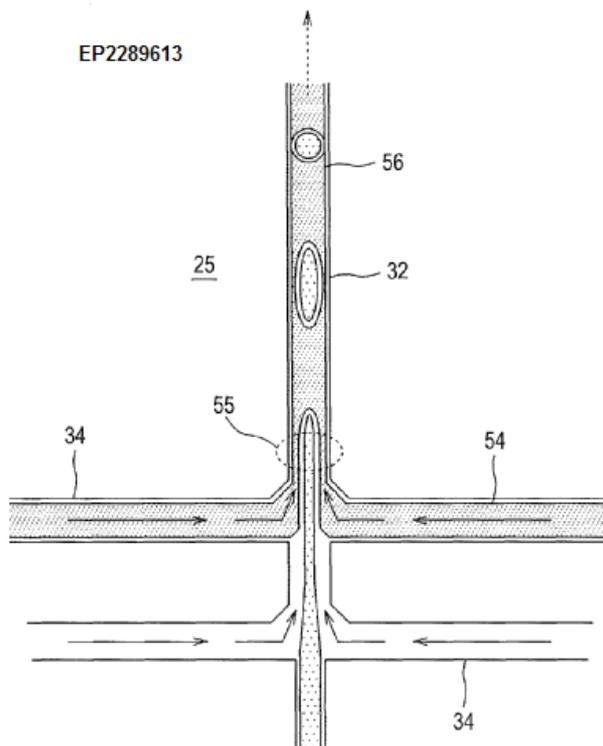
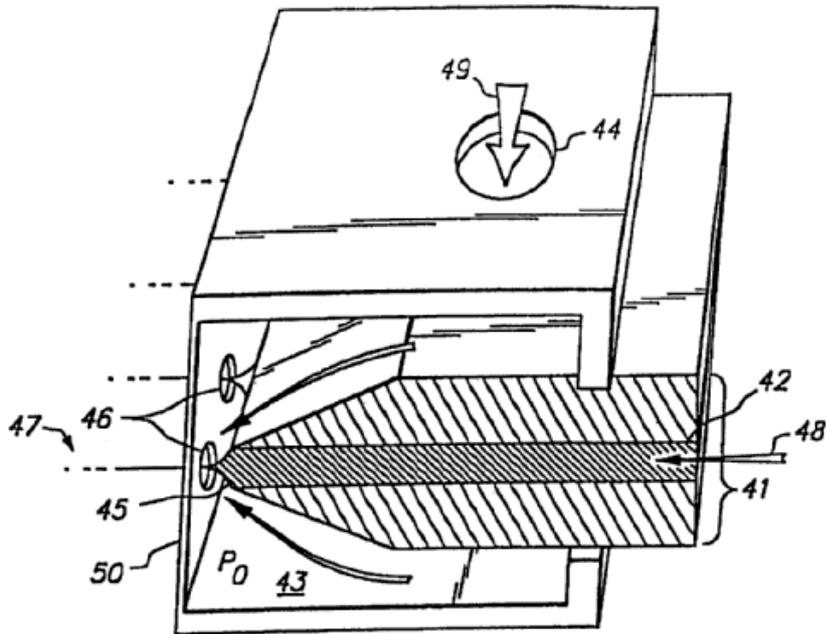
## B01F 13/0062

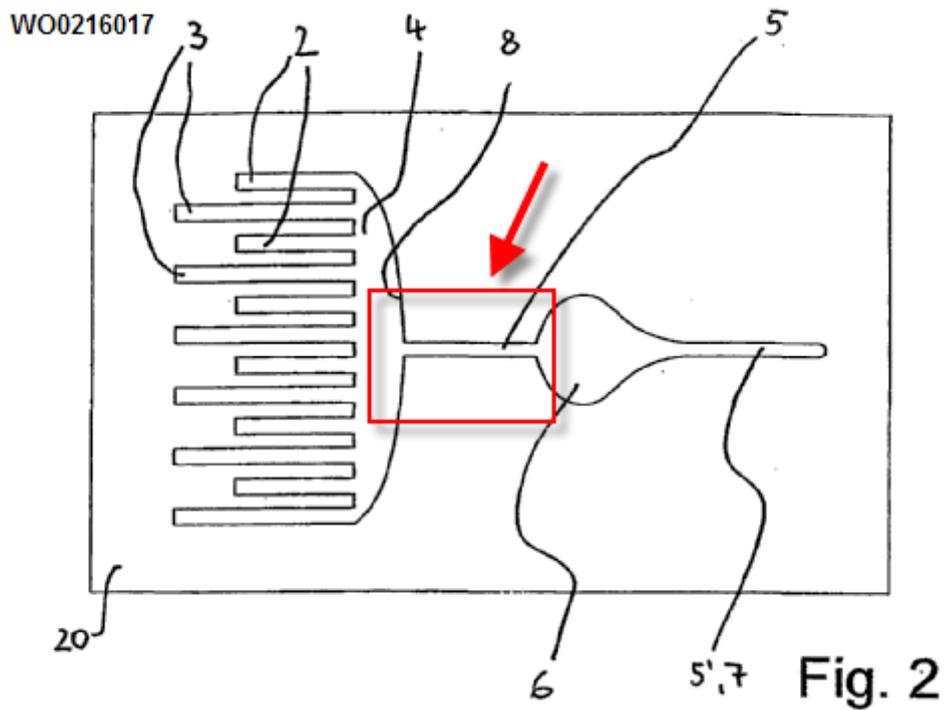
### [N: Hydrodynamic focussing]

#### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.





## B01F 13/0064

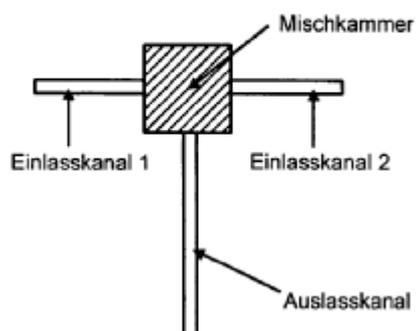
[N: Mixing chamber]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

DE 20 2005 005 628 U1



## B01F 13/0066

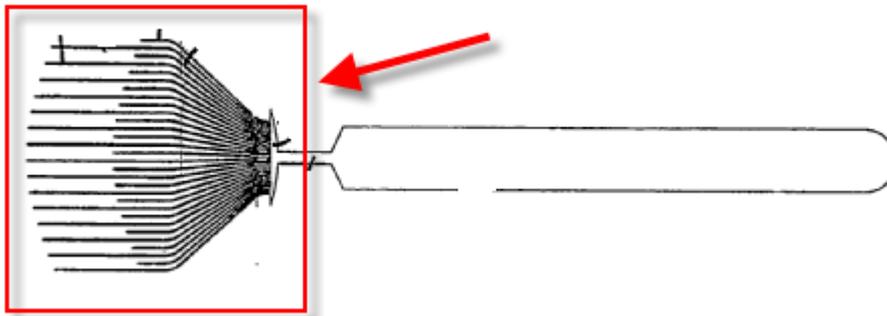
[N: Interdigital streams, i.e. lamellae]

### Definition statement

*This subclass/group covers:*

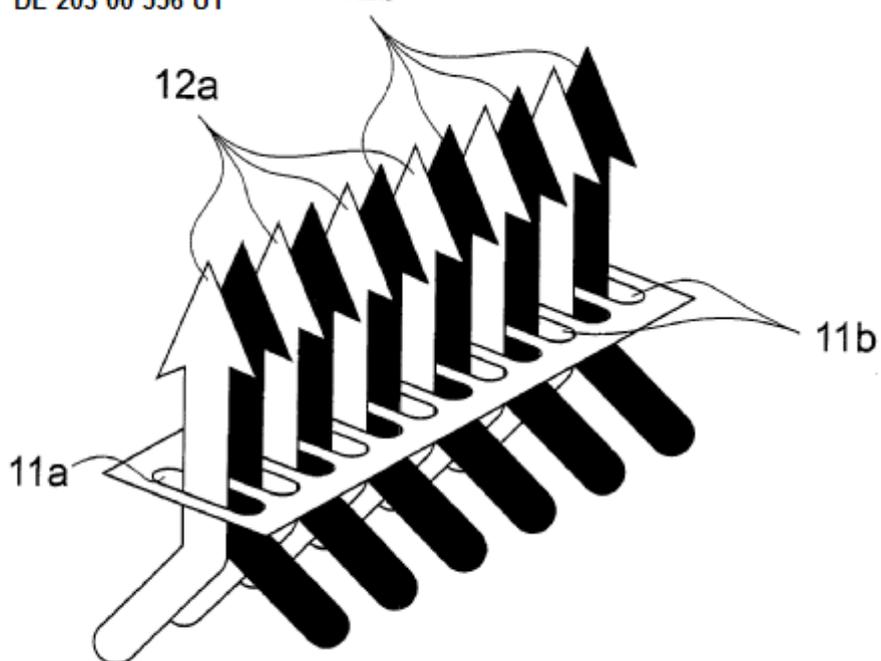
Illustrative examples of subject matter classified in this group.

WO 02/16017



DE 203 00 556 U1

12b



### B01F 13/0067

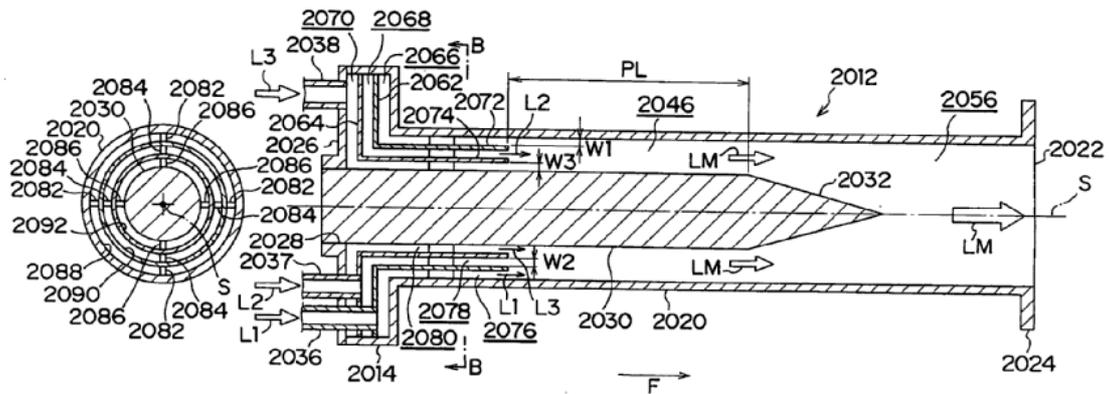
[N: The interdigital streams being concentric lamellae]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

FIG.31A



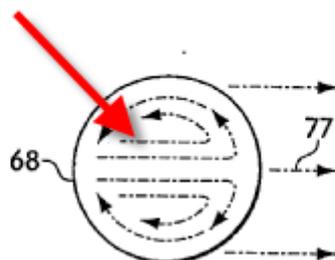
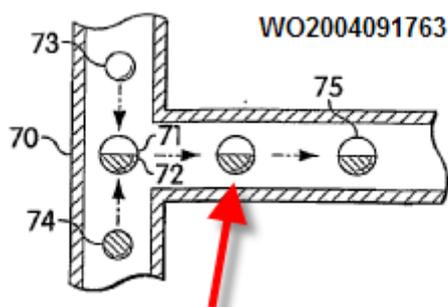
**B01F 13/0071**

[N: the components to be mixed being combined in a single independent droplet, e.g. these droplets being divided by a non-miscible fluid or consisting of independent droplets]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



**B01F 13/0072**

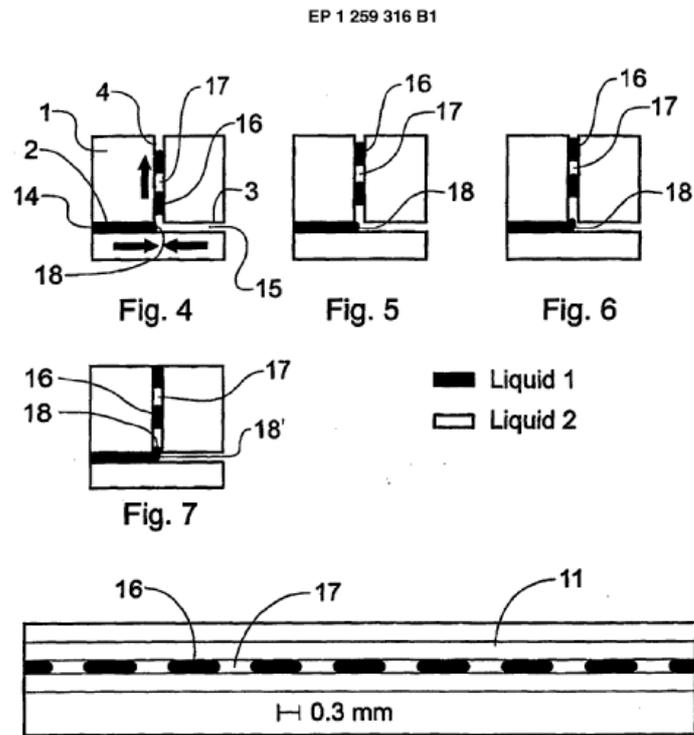
[N: the components being formed by independent droplets]

which are alternated, the mixing of the components being achieved by diffusion between droplets]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



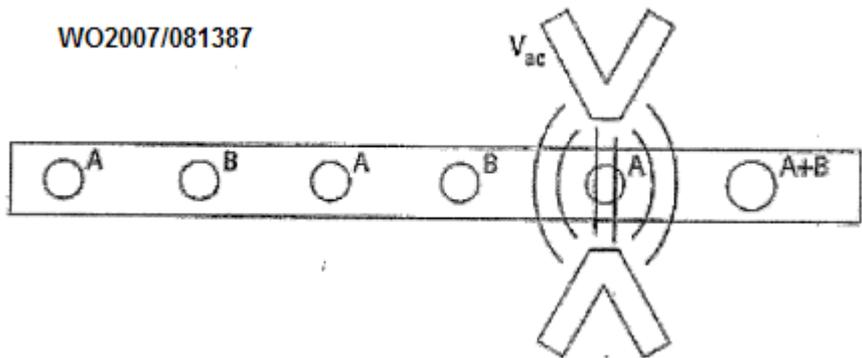
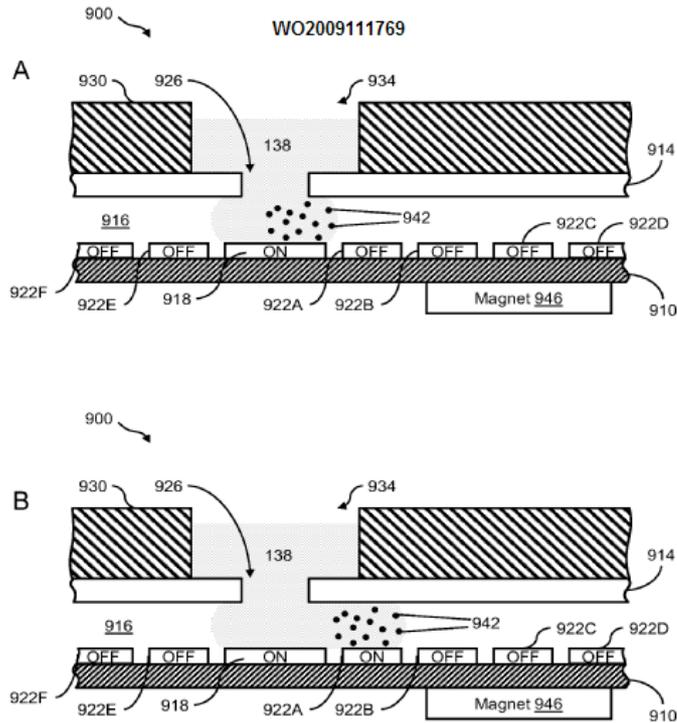
**B01F 13/0076**

[N: using electrohydrodynamic (EHD) or electrokinetic (EKI) phenomena to mix or move the fluids]

**Definition statement**

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.



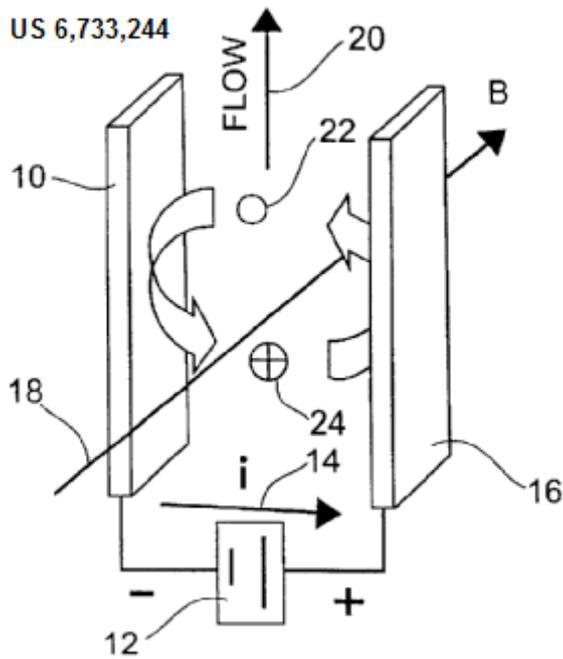
**B01F 13/0077**

[N: using magnetohydrodynamic (MHD) phenomena to mix or move the fluids]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



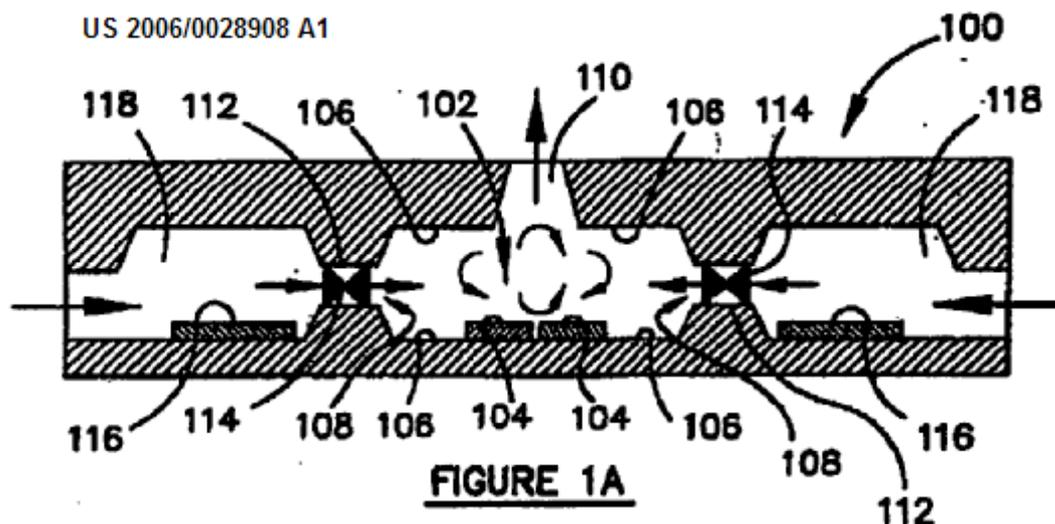
**B01F 13/0079**

[N: using heat to mix or move the fluids]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



**B01F 13/0084**

[N: using hydrophilic/hydrophobic surfaces]



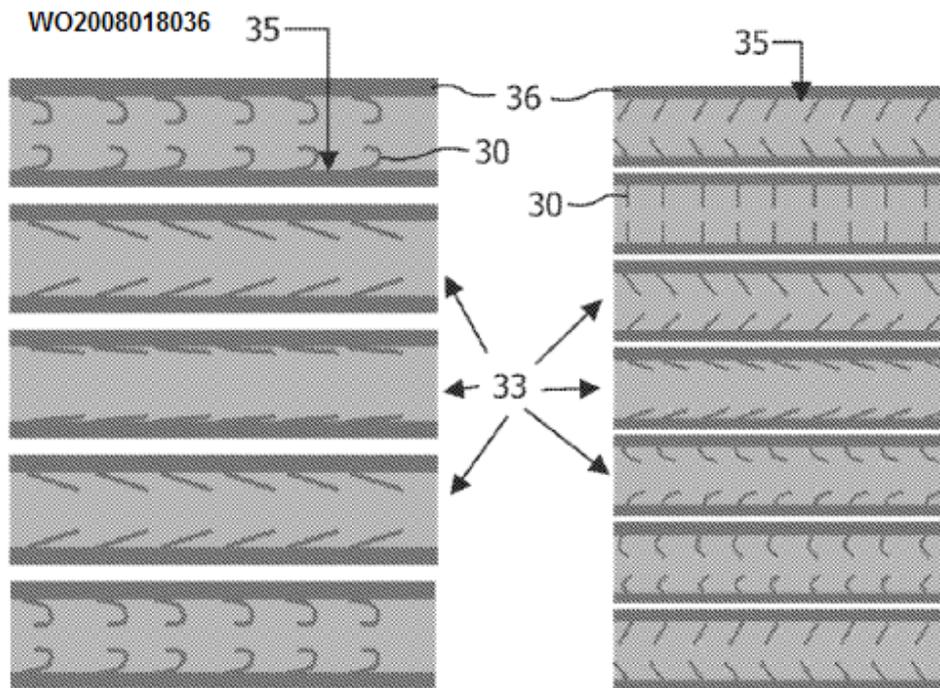
## B01F 13/0091

[N: using ciliary stirrers to move or stir the fluids]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



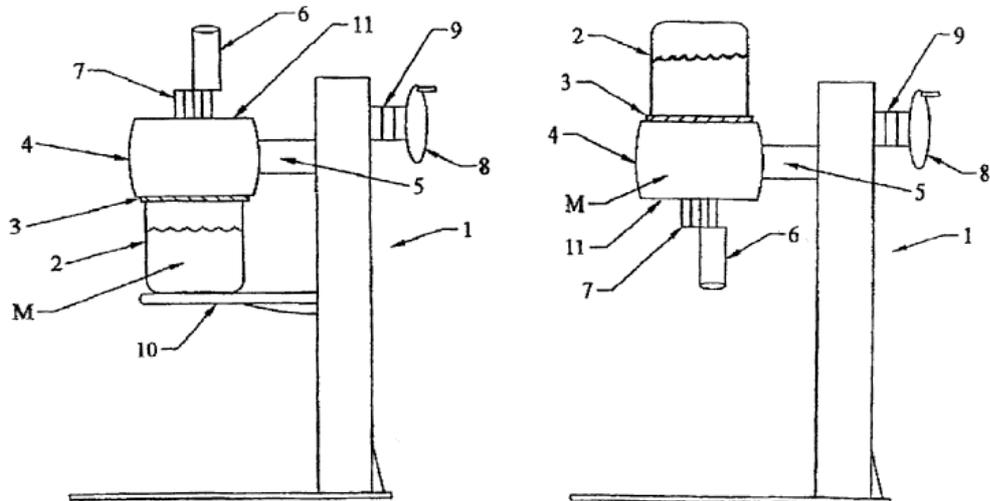
## B01F 13/0098

[N: Mixing after turning the mixing vessel upside down]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 13/02

Mixers with gas [N: or liquid] agitation, e.g. with air supply tubes [N: ([B01F 3/04106](#) takes precedence; supplying ingredients in concrete mixers with a pneumatic or hydraulic conveyer [B28C 7/062](#); fluidising devices facilitating filling or emptying of containers [B65D 88/72](#))]

### Definition statement

*This subclass/group covers:*

Mixing using a gas or a liquid as agitation means, said gas or liquid not mixing with the materials forming the mixture.

### References relevant to classification in this group

*This subclass/group does not cover:*

Mixing, the gas being introduced by bubbling	<a href="#">B01F 3/04106</a>
--	------------------------------

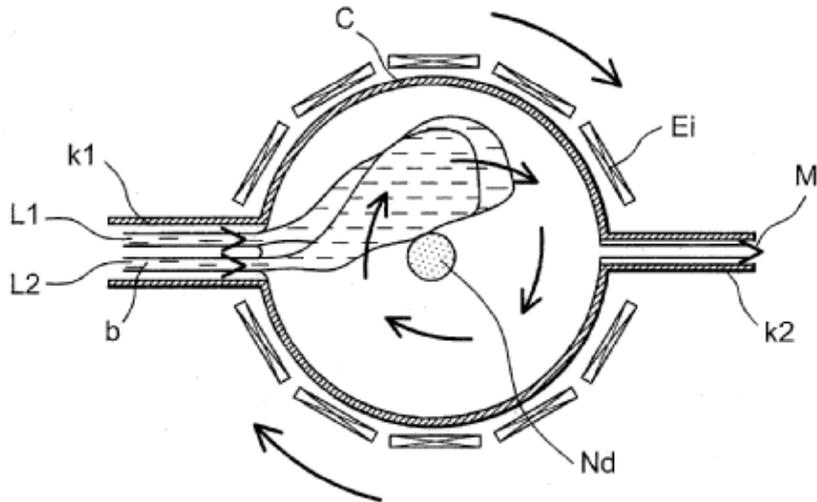
## B01F 13/0809

[N: the mixture being directly submitted to an electromagnetic field without use of a stirrer, e.g. for material comprising ferromagnetic particles, or for molten metal]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 13/0818

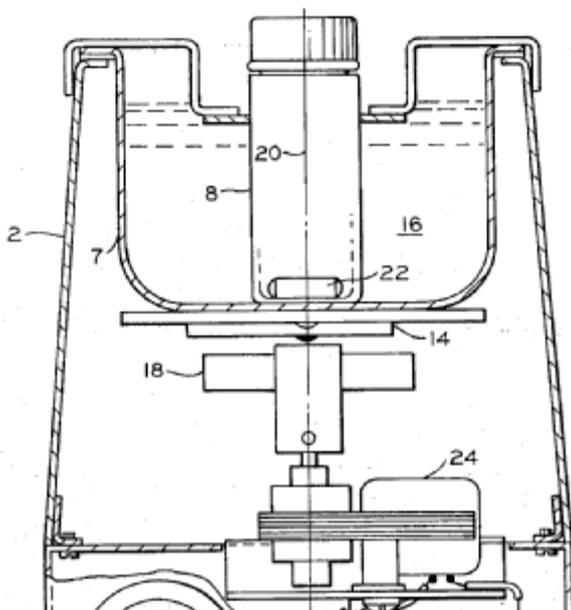
[N: using independant floating stirring elements]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

US 3,807,704



## B01F 13/0827

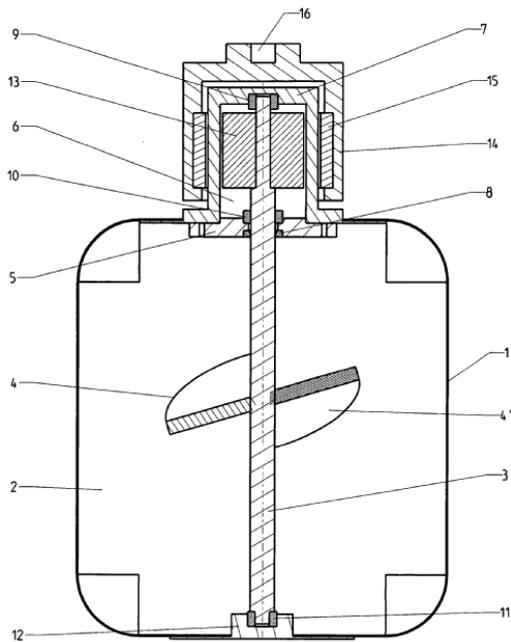
[N: using supported or suspended stirring elements]

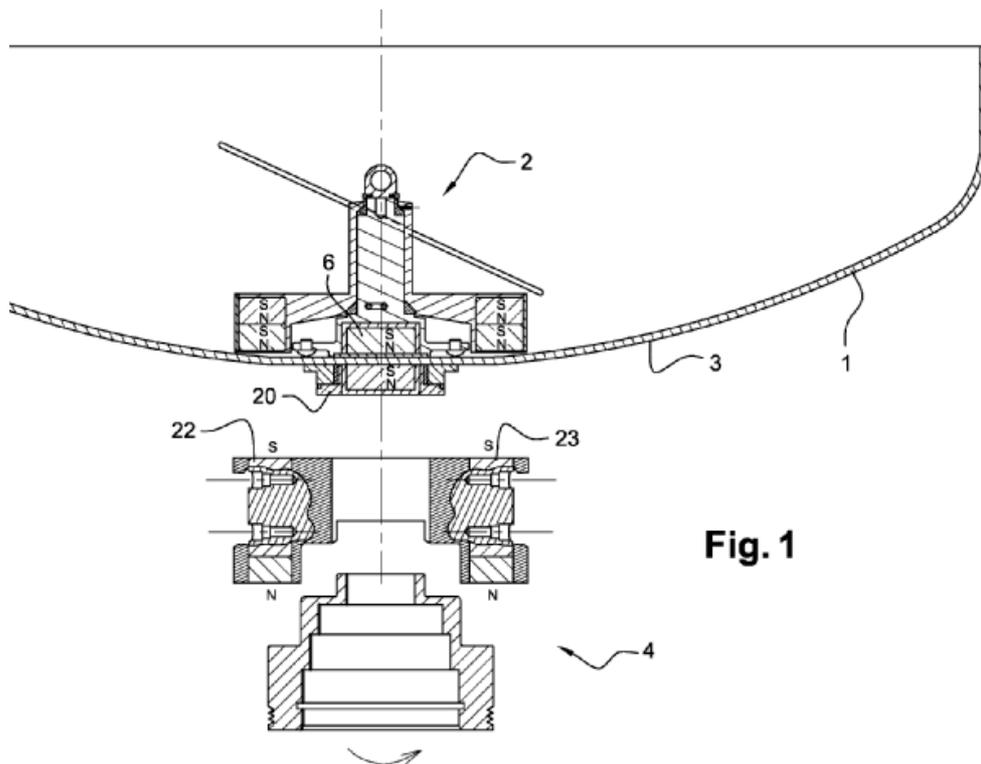
### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

DE 20 2009 006 840 U1 2009.08.20  
Anhängende Zeichnungen





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Fig. 1

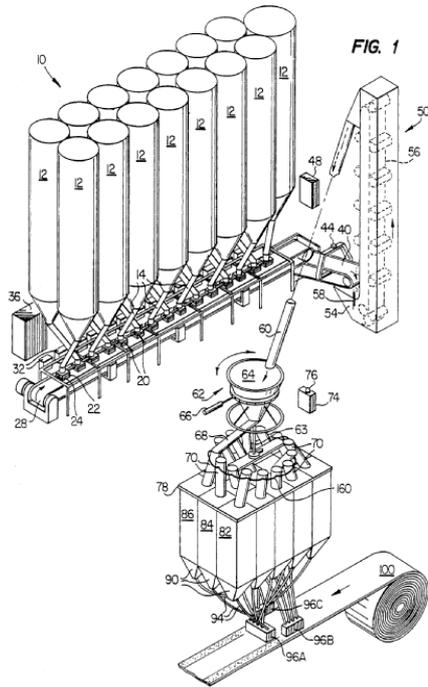
## B01F 13/1005

[N: with several silos arranged in a row or around a central delivery point, e.g. provided with proportioning means]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 13/1041

[N: comprising mixers specially adapted for mixing in combination with disintegrating ([B01F 7/048](#), [B01F 13/1002](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Mixing devices and methods which, additionally, comprise means for disintegrating material.

### References relevant to classification in this group

*This subclass/group does not cover:*

Crushing, pulverising or disintegrating in general; milling	<a href="#">B02C</a>
---	----------------------

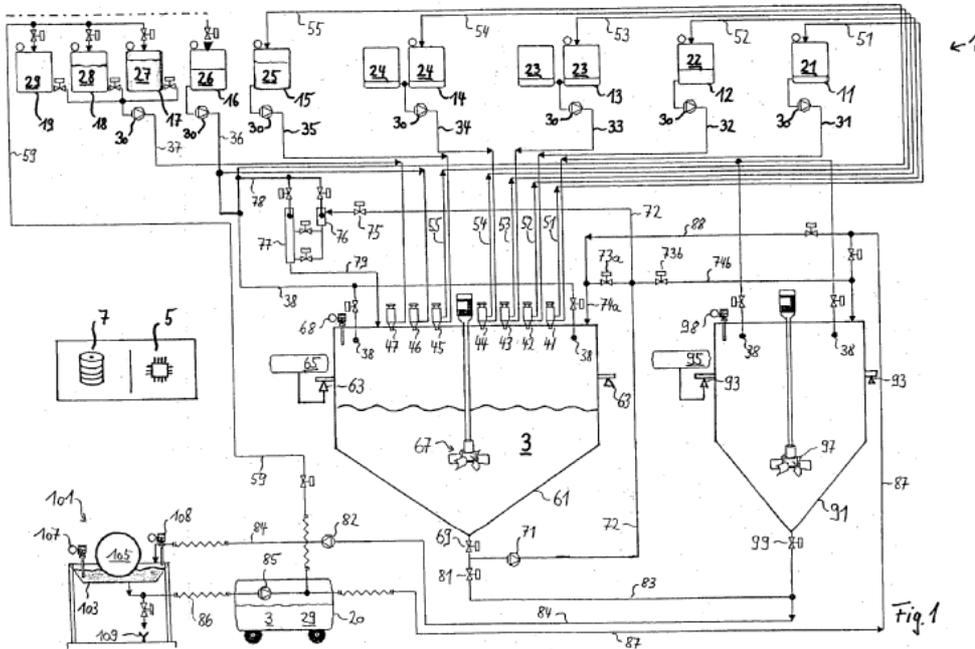
## B01F 13/1055

[N: Mixing plant with mixing receptacles receiving material dispended from several component receptacles, e.g. paint tins]

## Definition statement

This subclass/group covers:

Illustrative examples of subject matter classified in this group.



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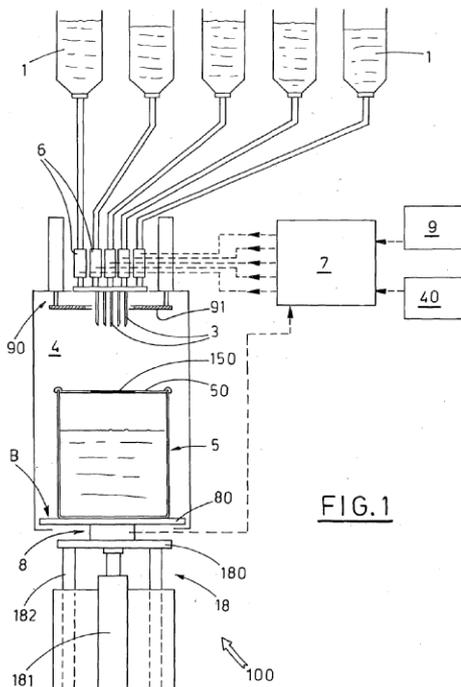


FIG. 1

## B01F 13/1058

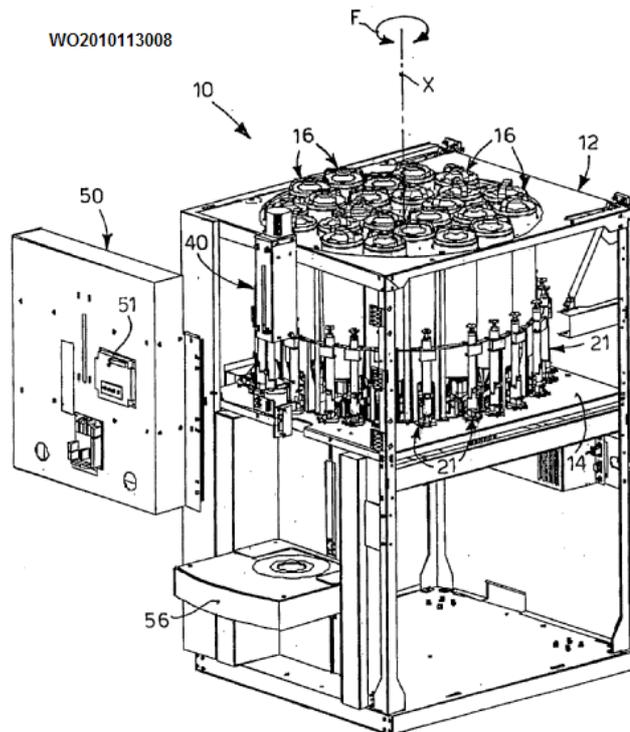
[N: with component receptacles fixed in a circular configuration on a horizontal table, e.g. the table being able to

**be indexed about a vertical axis]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



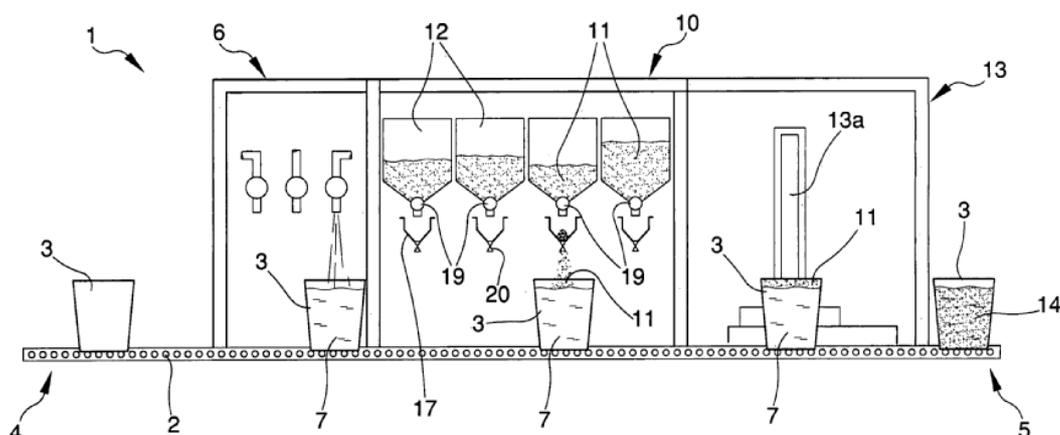
**B01F 13/1072**

**[N: Plants with a plurality of mixing receptacles or mixing tools, e.g. the receptacles or tools being able to be indexed into different working positions along a line or along a circle]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 15/00

**Accessories for mixers; [N: Auxiliary operations or auxiliary devices; Parts or details of general application]**

### Definition statement

*This subclass/group covers:*

Details or accessories of mixers when in direct combination with the mixing device per se, the accessory not being the essential element as such.

### Special rules of classification within this group

Accessories or mechanical details covered by a general (function-oriented) subclass and being the relevant information (claimed and/or described) in the document are not classified in this group.

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

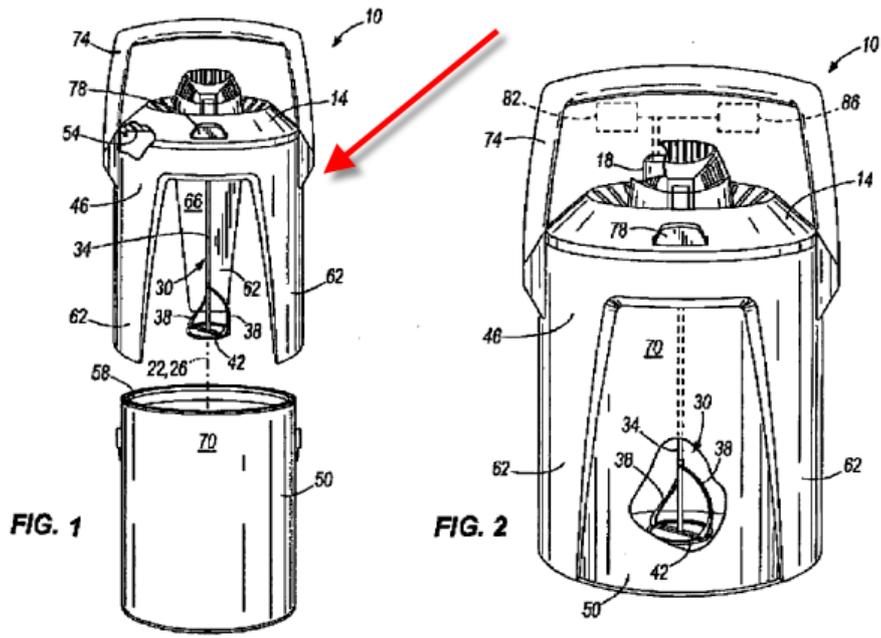
## B01F 15/00006

**[N: Mixing heads comprising a driven stirrer (mixing heads without driven stirrer [B01F 5/0077](#))]**

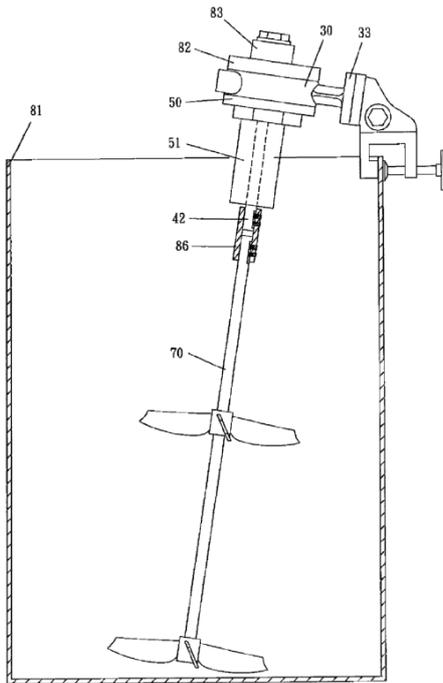
### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.



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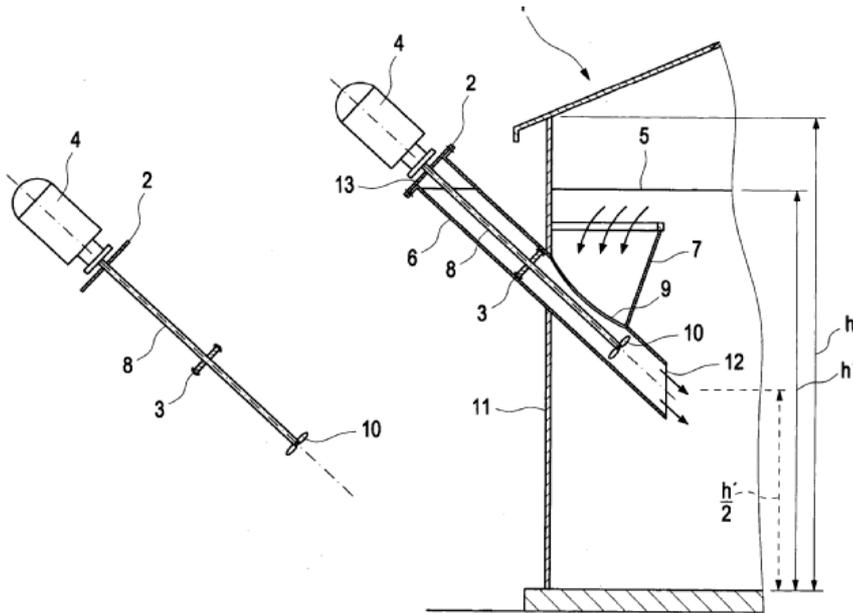
**B01F 15/0012**

[N: the stirrer being provided with a surrounding stator]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



DE 20 2010 015 332 U1 2011.03.17

### B01F 15/00019

[N: Washing or cleaning mixers, e.g. using knockers or scrapers; Inhibiting build-up of material on machine parts (cleaning in general [B08B](#))]

#### References relevant to classification in this group

*This subclass/group does not cover:*

Cleaning in general	<a href="#">B08B</a>
---------------------	----------------------

### B01F 15/00123

[N: Controlling; Testing; Measuring ([B01F 15/0408](#) takes precedence)]

#### Definition statement

*This subclass/group covers:*

Control, test or measuring elements in combination with the mixing device, the specific details of said elements not being of relevance.

#### References relevant to classification in this group

*This subclass/group does not cover:*

Measuring, testing in general	G01
-------------------------------	-----

Control systems in general	<a href="#">G05D</a>
----------------------------	----------------------

## **B01F 15/00435**

**[N: Drives, e.g. for reciprocating motion; Transmissions; Brakes; Couplings ([B01F 15/00201](#), [B01F 15/00668](#) take precedence; drives using magnetic couplings [B01F 13/08](#))]**

### **Definition statement**

*This subclass/group covers:*

The mentioning of the driving means, transmissions, brakes or couplings (in a generic form) in combination with the mixing device.

### **References relevant to classification in this group**

*This subclass/group does not cover:*

Mounting or supporting stirrer shafts on receptacles	<a href="#">B01F 15/00668</a>
Wind motors	<a href="#">F03D</a>
Hydraulic motors	<a href="#">F15B</a>
Brakes	<a href="#">F16D</a>
Couplings	<a href="#">F16D</a>
Transmissions	<a href="#">F16G</a> , <a href="#">F16H</a>
Electric motors	<a href="#">H02K</a>

### **Special rules of classification within this group**

Drive units, transmissions, brakes or couplings per se, i.e. when said elements and/or their details are the essential part of the described or claimed invention are not classified in this group.

## **B01F 15/00441**

**[N: Construction of driving shafts]**

## References relevant to classification in this group

*This subclass/group does not cover:*

Shafts, in general	<a href="#">F16C</a>
--------------------	----------------------

## B01F 15/00467

**[N: Driving reciprocating or oscillating stirrers]**

## References relevant to classification in this group

*This subclass/group does not cover:*

Devices for generating or transmitting vibrations, in general. Drive units as such for generating the shaking, oscillating, or vibrating movement	<a href="#">B06B</a>
---	----------------------

## B01F 15/00733

**[N: Clamping or holding arrangements for mounting receptacles on mixing devices, e.g. for shaking, vibrating or rotating the receptacle]**

## Special rules of classification within this subclass/group

The holding elements for mounting the receptacles on mixing devices are to be classified in [B01F 15/00733](#) but some are still left in [B01F 9/0032](#)

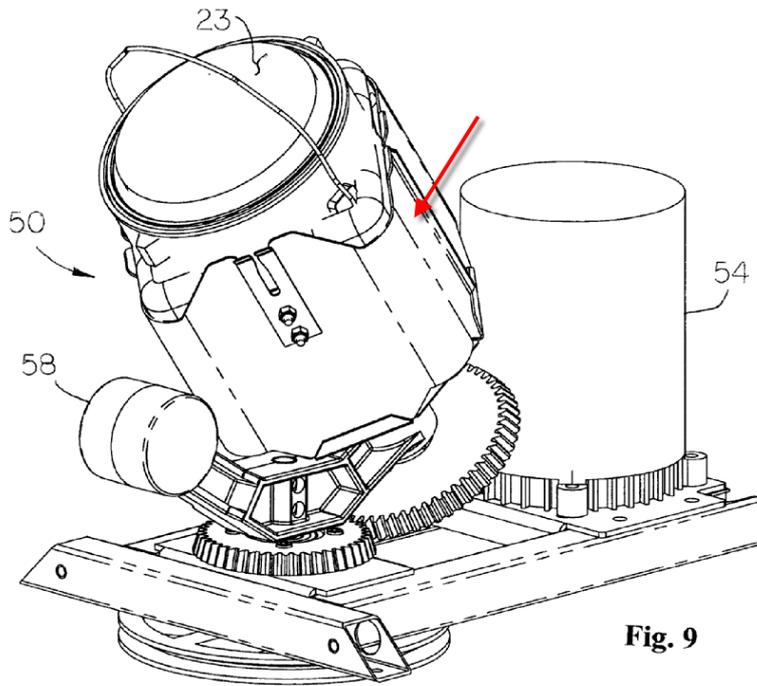
## B01F 15/0074

**[N: having a cup-shaped or cage-type form]**

## Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



**Fig. 9**

**B01F 15/00746**

**[N: having a jaw-type or finger-type shape]**

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

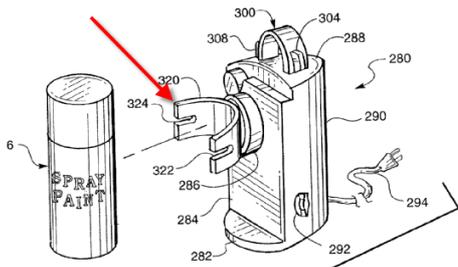


FIG. 14.

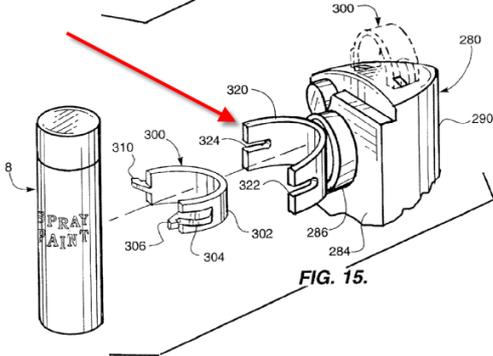


FIG. 15.

## B01F 15/00753

[N: of the vertically movable, two-plates type]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

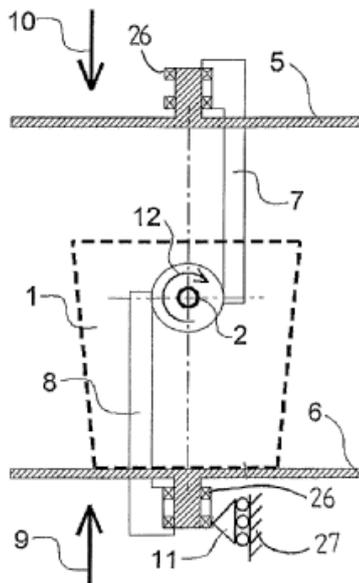


Fig. 1

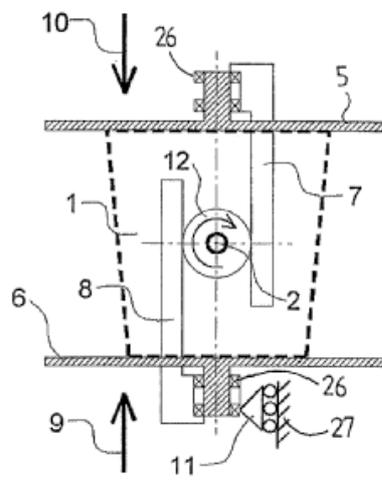


Fig. 2

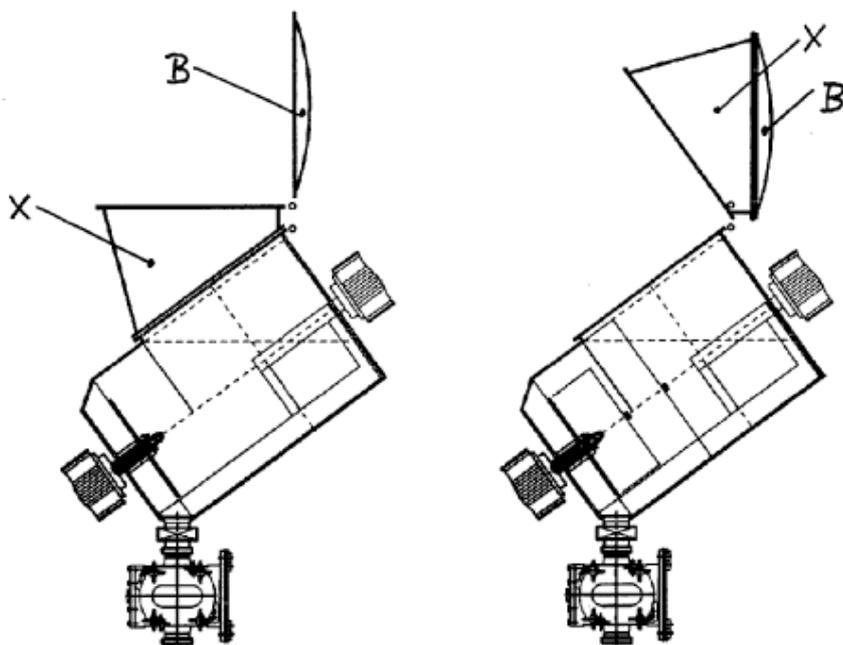
**B01F 15/00785**

[N: by rotating them about an axis parallel to the plane of the opening]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## **B01F 15/00792**

[N: by moving them in the plane of the opening ([B01F 15/00818](#) takes precedence)]

### **Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

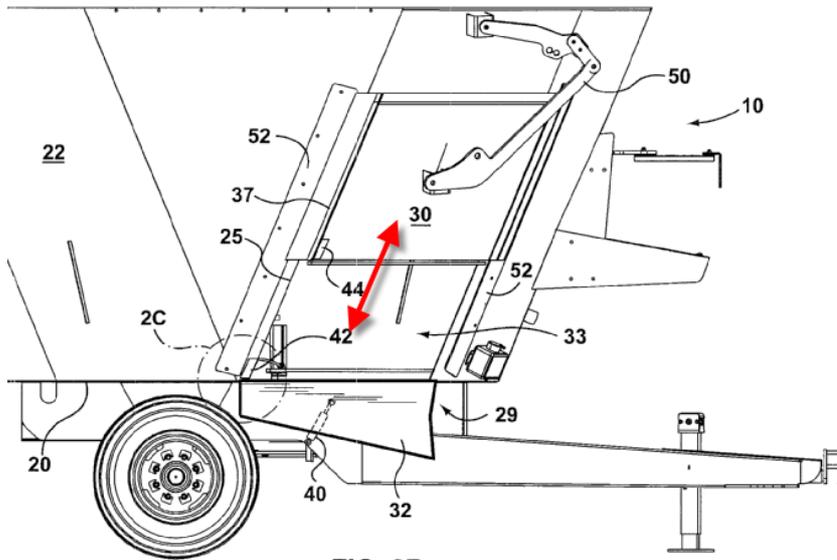


FIG. 2B

**References relevant to classification in this group**

*This subclass/group does not cover:*

Moving covers on a cylindrical drum in a circular path along the drum	<a href="#">B01F 15/00818</a>
---	-------------------------------

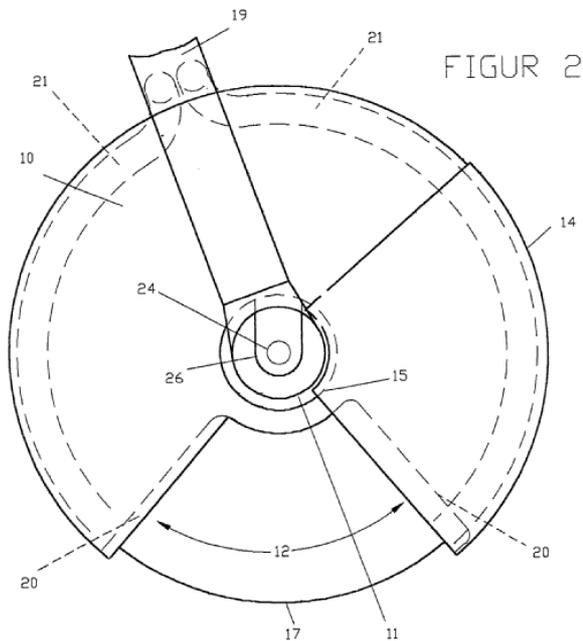
**B01F 15/00798**

[N: by rotating them about an axis perpendicular to the plane of the opening]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



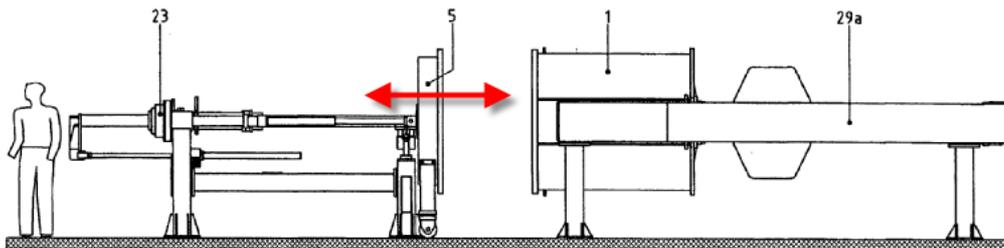
**B01F 15/00805**

[N: by moving them perpendicular to the plane of the opening]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



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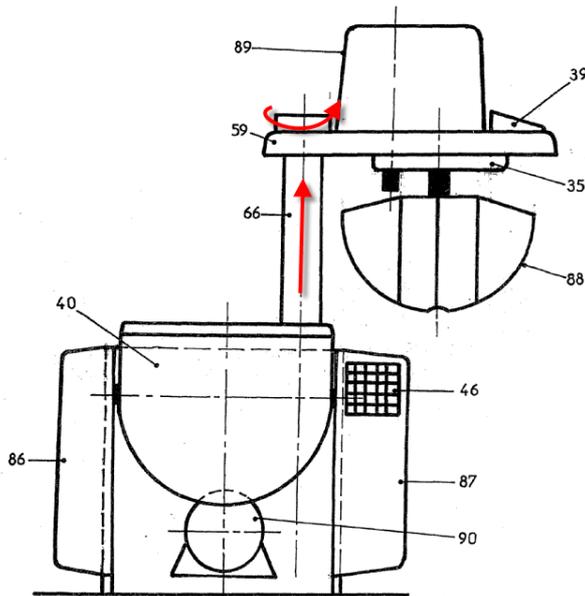
**B01F 15/00811**

[N: and moving them afterwards in another direction]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



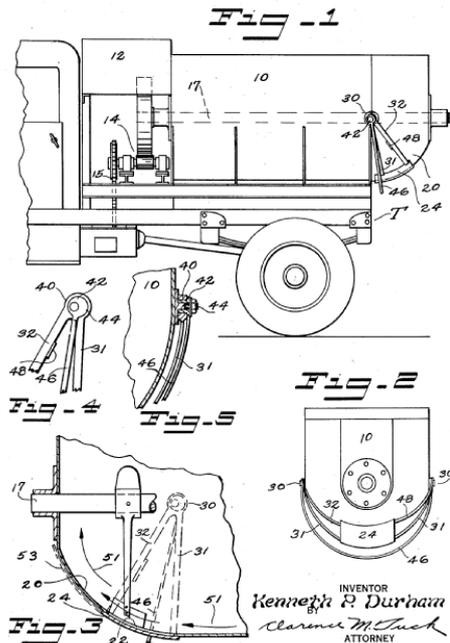
## B01F 15/00818

[N: Moving covers on a cylindrical drum in a circular path along the drum]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## B01F 15/00824

[N: Receptacles ([B01F 9/0032](#), [B01F 15/00779](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Specific features of the receptacles/containers in which the mixing is performed not covered by any of the main groups [B01F 1/00](#), [B01F 3/00](#), [B01F 5/00](#), [B01F 7/00](#), [B01F 9/00](#), [B01F 11/00](#) and [B01F 13/00](#).

## B01F 15/00831

[N: Nature of the receptacle]

### Definition statement

*This subclass/group covers:*

The material or surface finish of the (walls of the) receptacle.

## B01F 15/0087

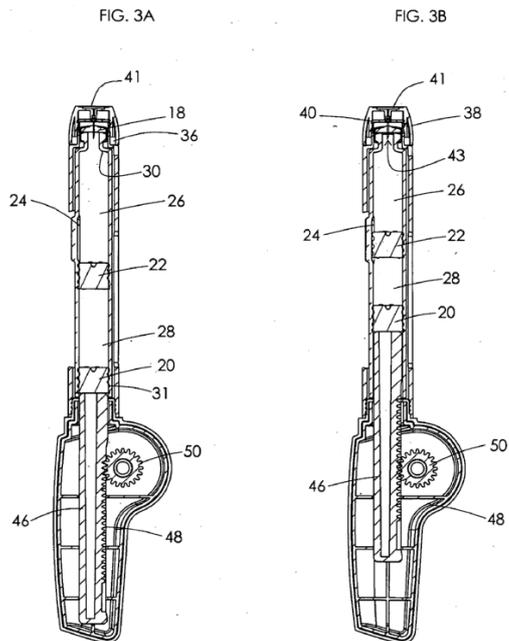
[N: comprising compartments keeping the materials to be mixed separated until the mixing is initiated ([B65D 81/32](#) takes precedence)]

## Definition statement

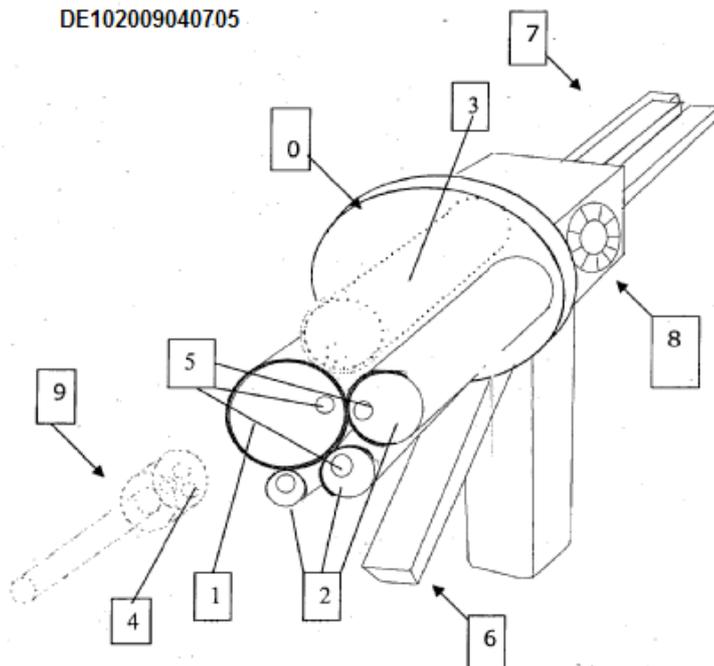
*This subclass/group covers:*

Containers, receptacles or set of them for keeping the materials to be mixed until the moment of mixing. Normally this kind of materials are to be mixed immediately before their final use (e.g. for specific glues or polymers, paints, beverages, medicaments, dental material, bone cement, etc.). Examples:

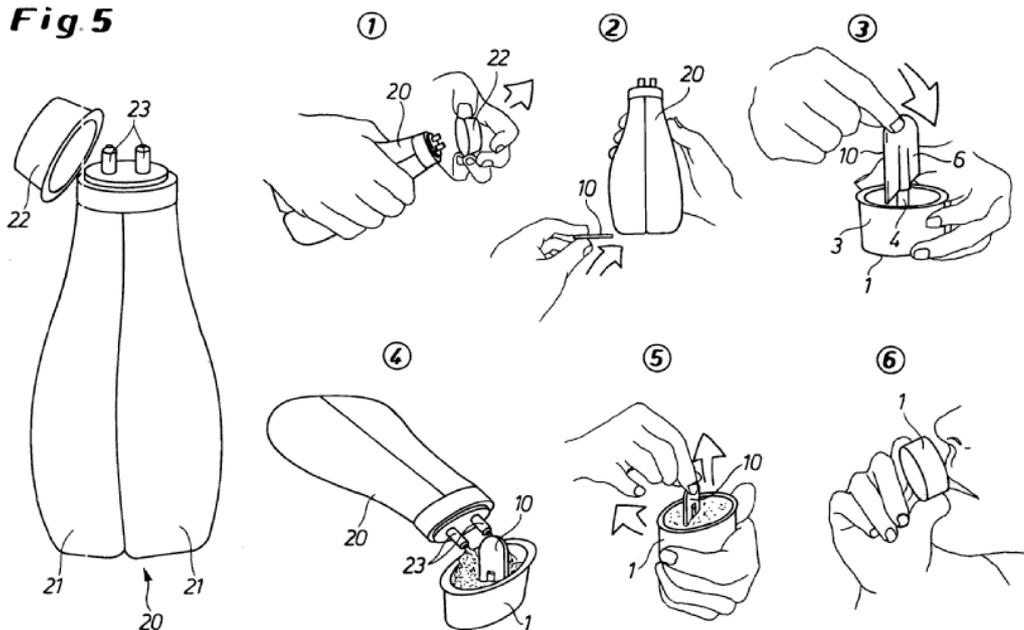
Patent Application Publication Dec. 17, 2009 Sheet 3 of 5 US 2009/0308895 A1



DE102009040705



**Fig 5**

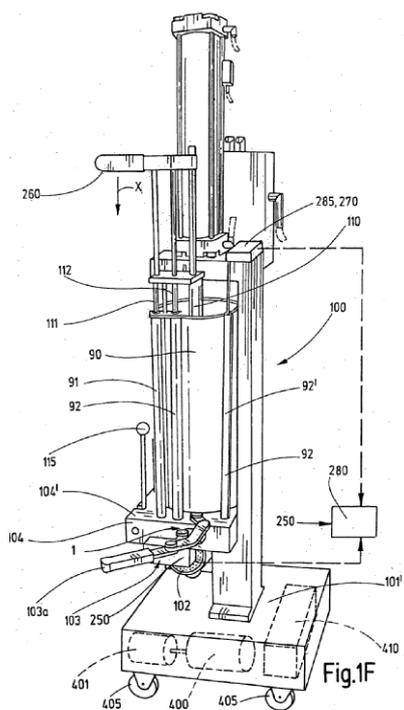


W/O 2006/126633

- 3 / 3 -

PCT/EP2006/002725

EP 2 027 912 A1



**References relevant to classification in this group**

*This subclass/group does not cover:*

Containers, packaging elements, or packages for packaging two or more different materials which must be maintained separate prior to use in admixture

[B65D 81/32](#)

---

## B01F 15/00876

[N: Configuration of the interior]

### Definition statement

*This subclass/group covers:*

The shape of the receptacle, when relevant for the mixing process. Elements attached to the receptacle as auxiliary means not covered by the previous subgroups. Example:

Patent Application Publication Jun. 30, 2011 Sheet 1 of 2 US 2011/0155373 A1

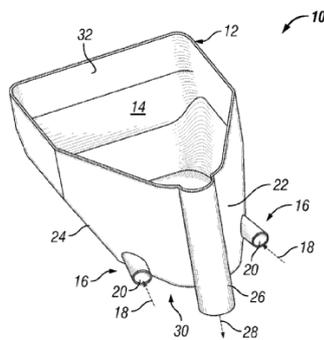
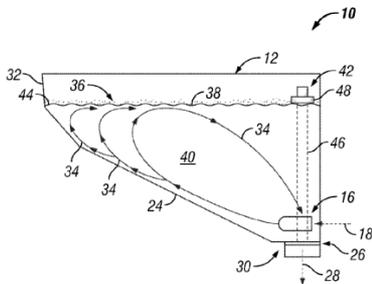


FIG. 1



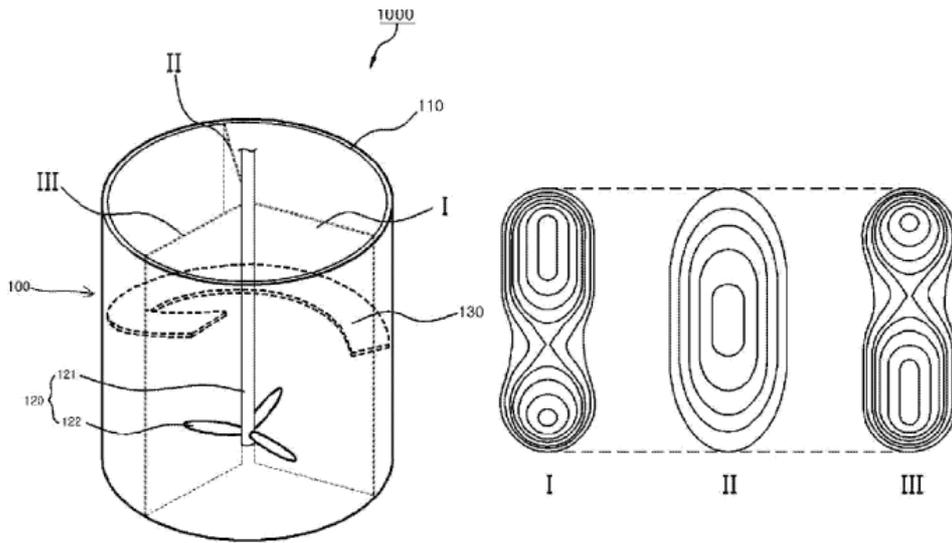
## B01F 15/00883

[N: provided with baffles, plates or bars on the wall or the bottom]

### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.



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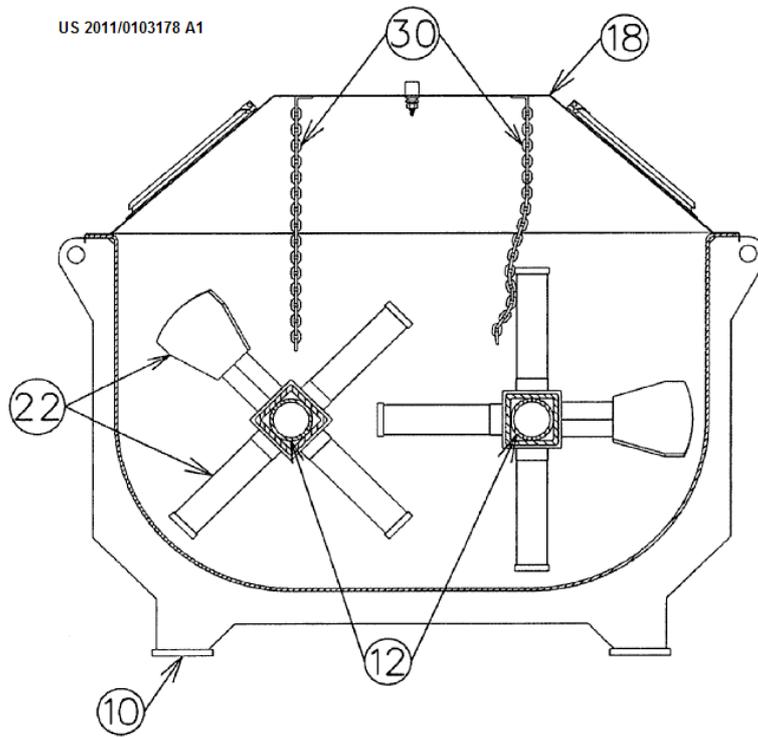


FIG. 10

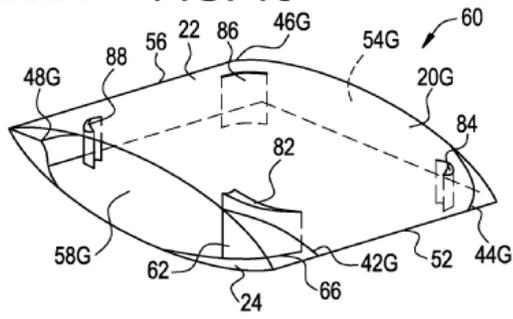
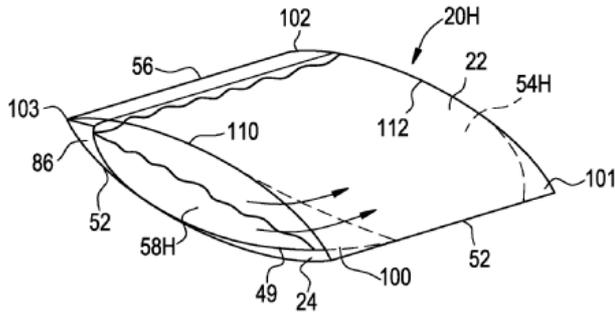


FIG. 11



**B01F 15/00902**

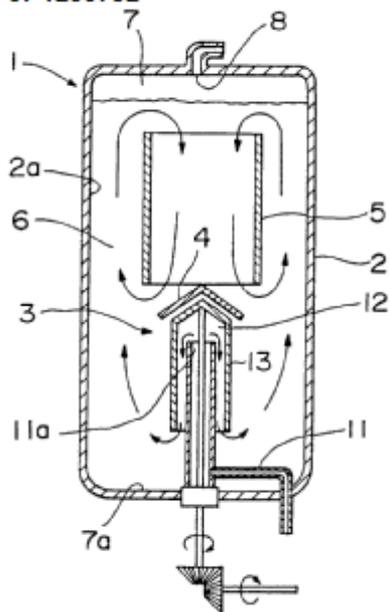
[N: provided with guide tubes on the wall or the bottom]

**Definition statement**

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.

JP1258732



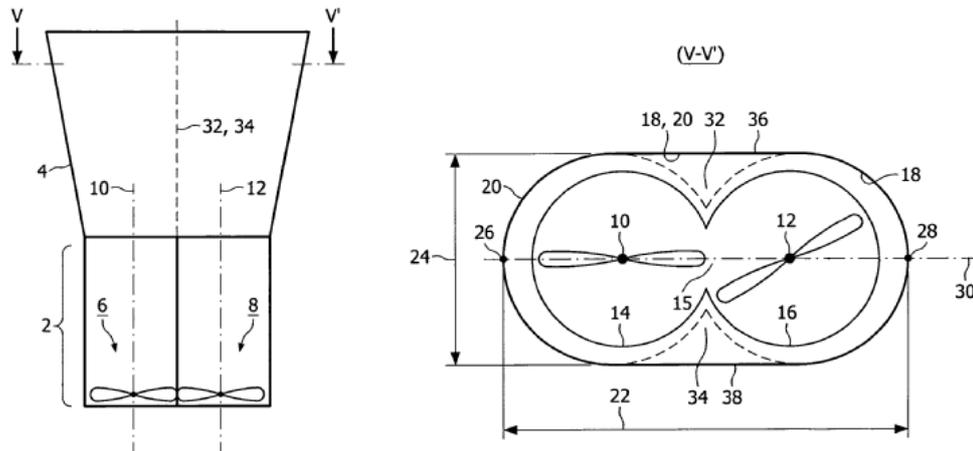
## B01F 15/00909

[N: Closely surrounding the rotating element]

### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



DE 20 2009 006 850 U 1 2009.09.24

## B01F 15/00915

[N: Baffles; Flow breakers]

### Definition statement

*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

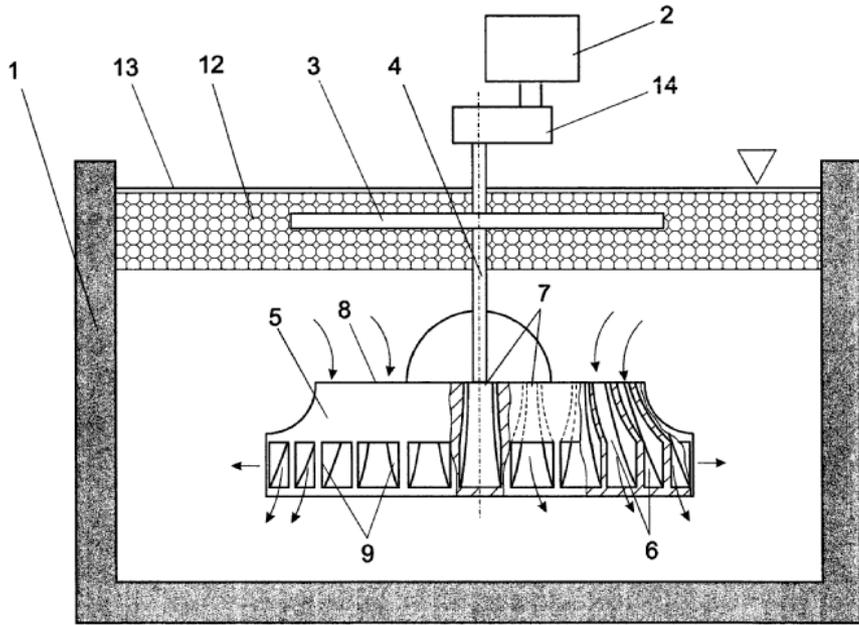
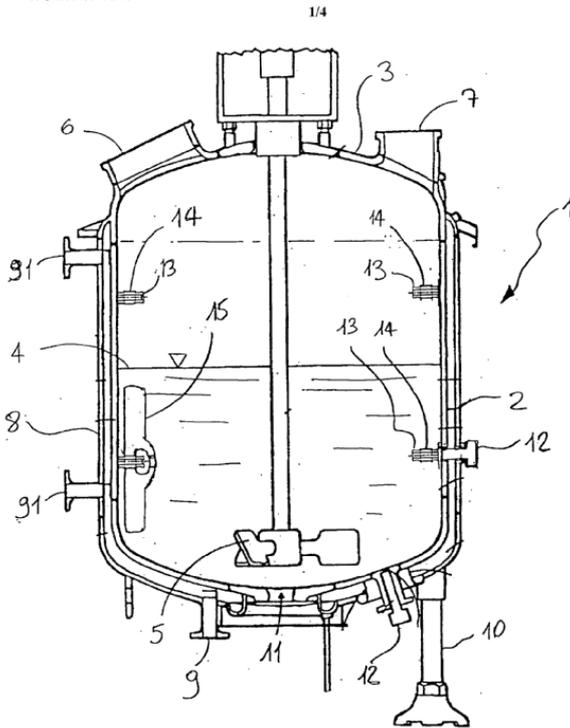
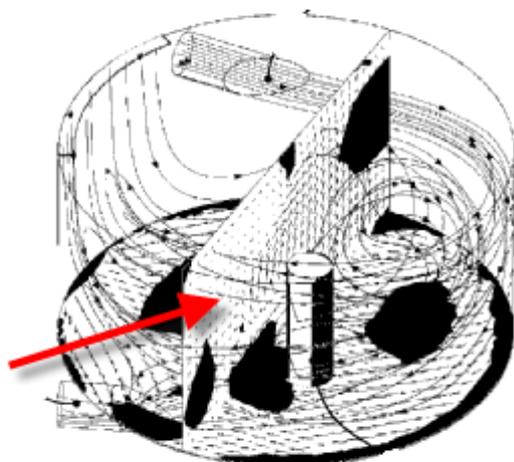


Fig. 1

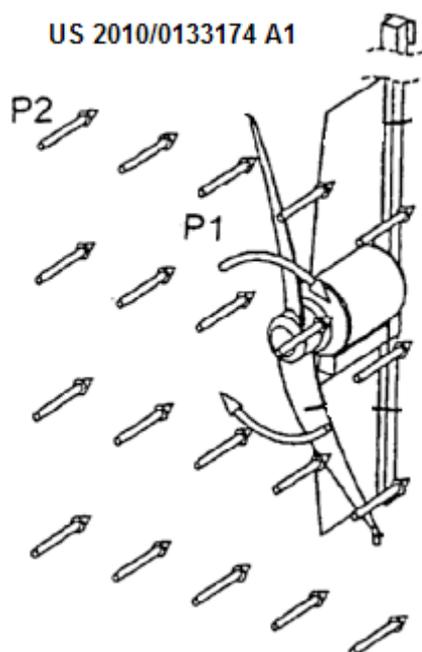
WO 2007/039270



WO2009043813 A1



US 2010/0133174 A1



## **B01F 15/00922**

**[N: Maintenance, e.g. replacing, repairing or inspecting;  
Making mixers or parts thereof]**

### **Definition statement**

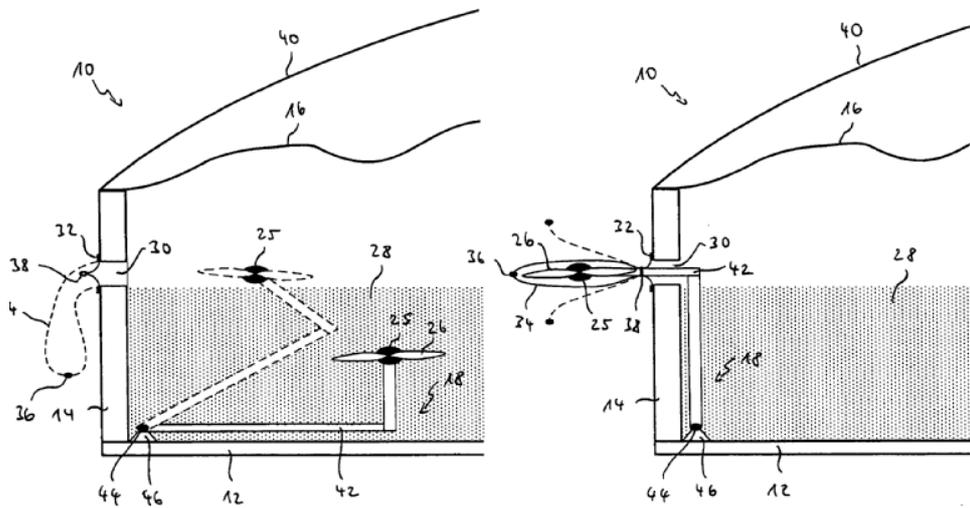
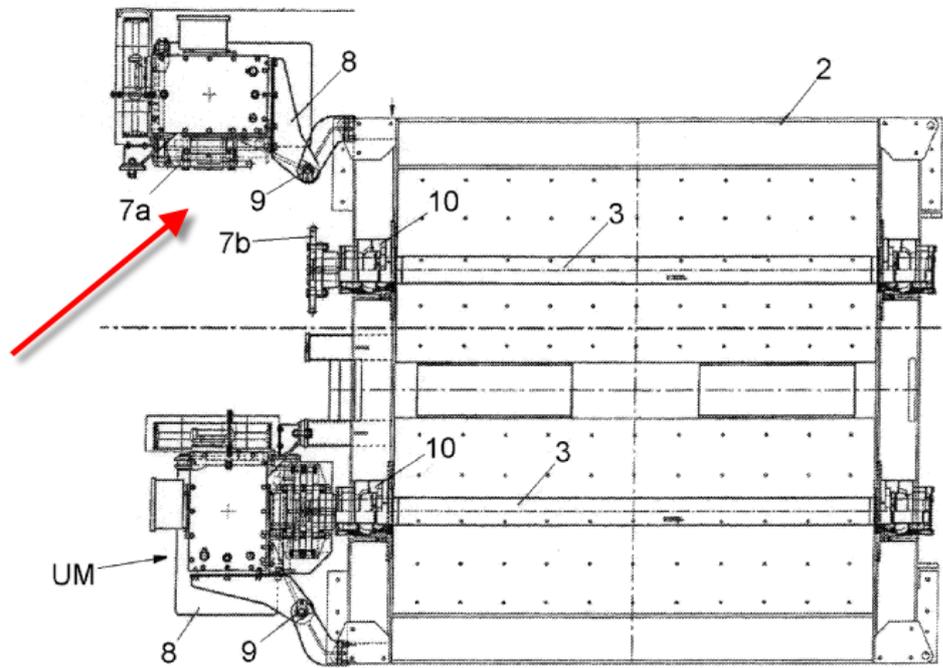
*This subclass/group covers:*

General measures directed to the maintenance, repairing, or inspection of mixing devices (e.g. means for mounting/dismounting specific parts, observation elements as man-holes, etc.).

It also covers ways of making the mixing elements which are not covered by specific general fields as [B29C](#), B22, B23 etc. Examples:

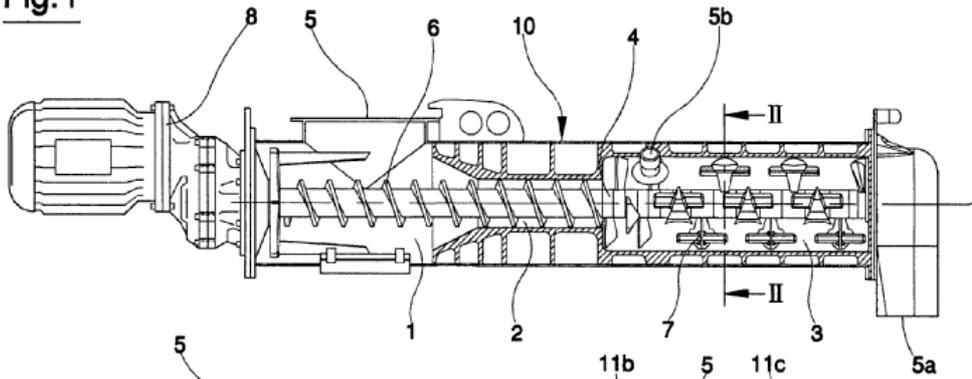
PCT/EP2008/050153

WO 2008/128795

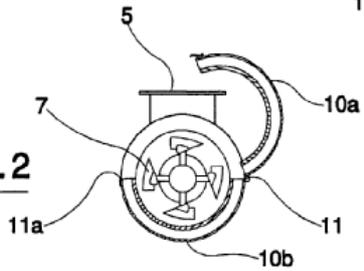


WO 2011/082787

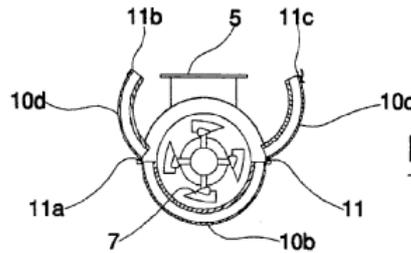
**Fig. 1**



**Fig. 2**



**Fig. 3**



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## B01F 15/00928

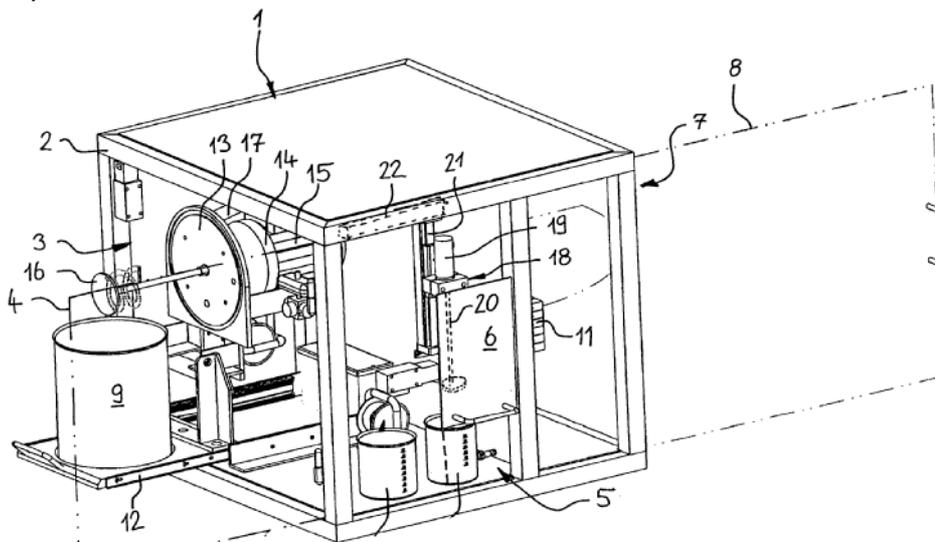
[N: General build-up of the mixers]

### Definition statement

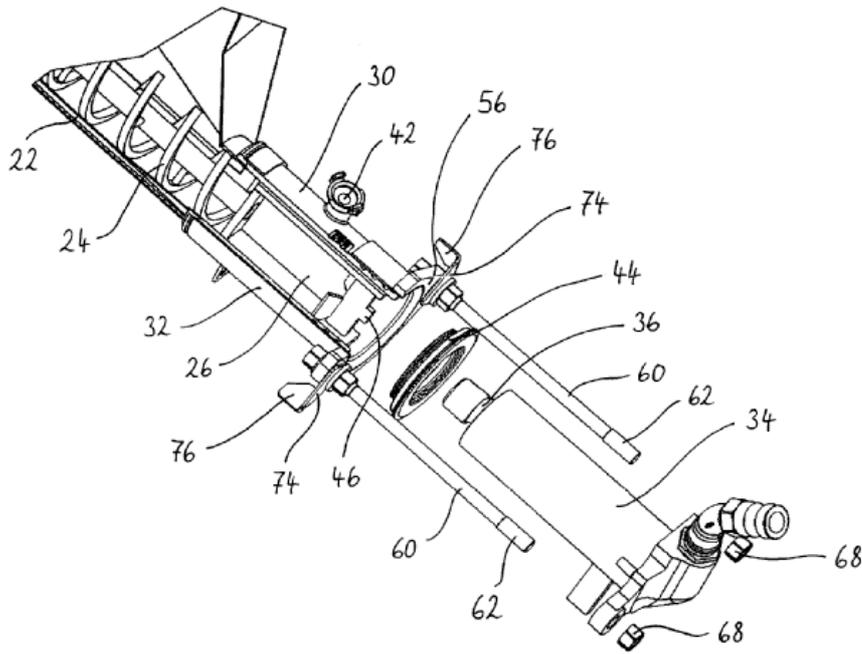
*This subclass/group covers:*

General specification about how the mixer is built-up, e.g. how the different elements are brought up together, how elements are mounted, etc.

Examples:

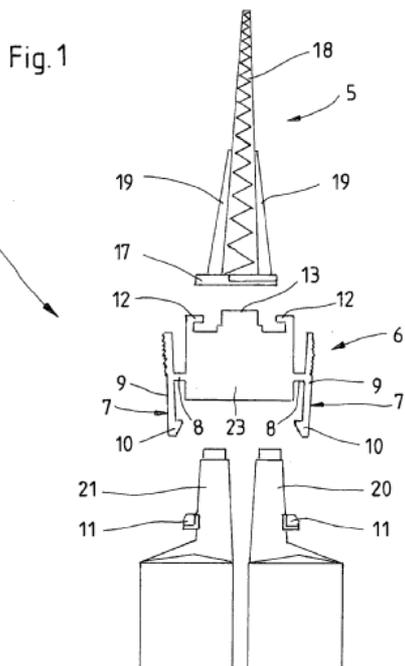


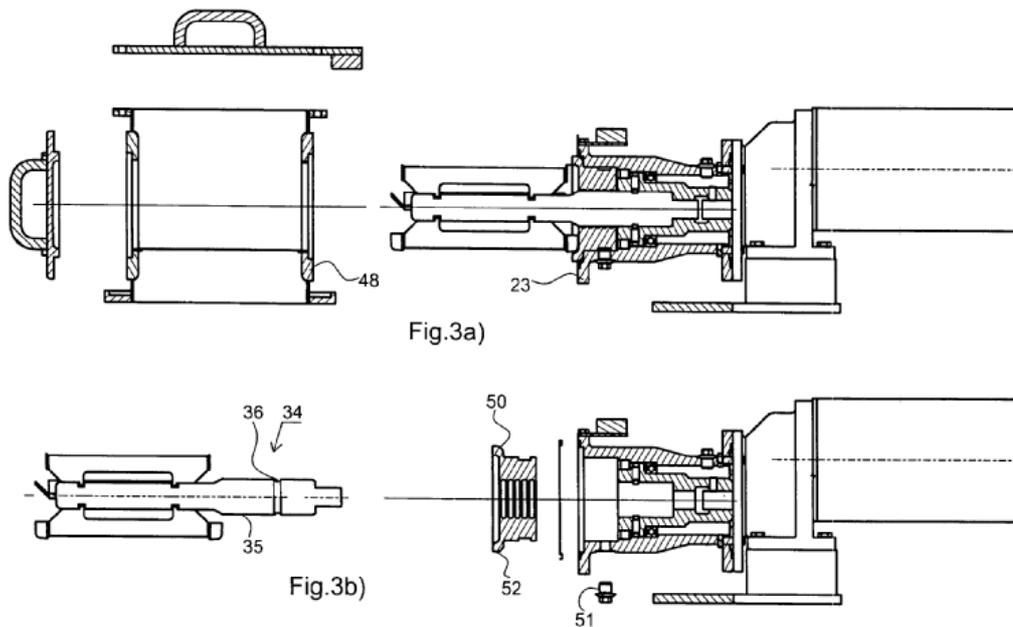
DE 20 2010 008 400 U1 2010.12.02  
Anhängende Zeichnungen



DE 20 2006 004 738 U1 2006.07.06

Anhängende Zeichnungen





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## B01F 15/02

### Feed or discharge mechanisms

#### Definition statement

*This subclass/group covers:*

Devices for feeding or discharging the mixer in combination with the mixing device.

#### References relevant to classification in this group

*This subclass/group does not cover:*

Conveying of materials, in general	<a href="#">B65G</a>
Loaing or unloading, in general	<b>B65G88/00</b>

#### Special rules of classification within this group

The feeding or discharging means per se are not classified in this group.

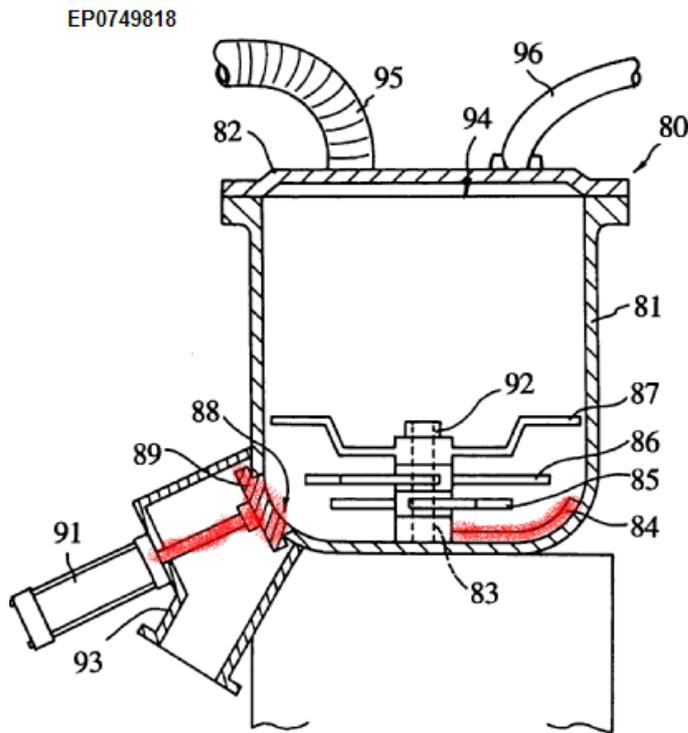
## B01F 15/0268

[N: the gate carrying a stirrer acting as discharge pump]

#### Definition statement

*This subclass/group covers:*

Illustrative example of subject matter classified in this group.



## **B01F 15/04**

**Forming a predetermined ratio of the substances to be mixed (controlling ratio of two or more flows of fluid or fluent material [G05D 11/02](#)) [N: ([G05D 11/00](#) takes precedence)]**

### **Definition statement**

*This subclass/group covers:*

Devices and methods for controlling the ratio of the components to be mixed in combination with means for mixing (i.e. homogenizing) the mixture of merged components.

### **References relevant to classification in this group**

*This subclass/group does not cover:*

Ratio control	<a href="#">G05D 11/00</a>
---------------	----------------------------

### **Special rules of classification within this group**

Generally control systems for establishing a correct ratio of components are

not classified in this group.

## B01F 15/0404

[N: Forming mixtures with changing ratio or gradient]

### Definition statement

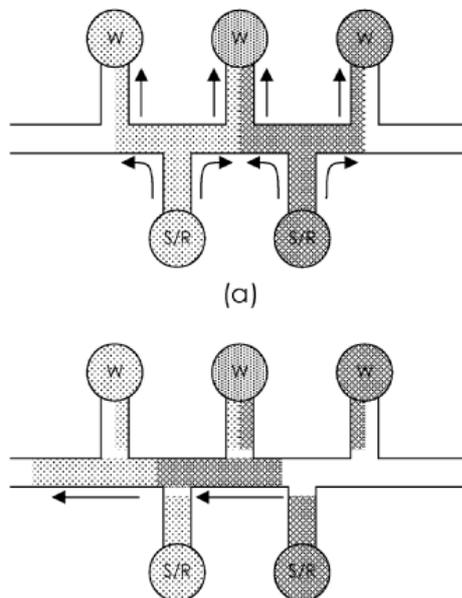
*This subclass/group covers:*

Illustrative examples of subject matter classified in this group.

WO 2007/121263

PCT/US2007/066461

[Figure 8]





*This subclass/group covers:*

Heating or cooling elements in combination with the mixing device, the specific details of the heat-exchange means not being of relevance.

## References relevant to classification in this group

*This subclass/group does not cover:*

Heat exchangers in general	F28
----------------------------	-----

## B01F 17/00

Use of substances as emulsifying, wetting, dispersing or foam-producing agents [N: see for particular applications relevant classes, e.g. lubricant emulsions [C10M](#); fuel emulsions [C10L 1/32](#); detergents [C11D](#); colour and dye dispersions [C09](#); textile applications [D06](#); cosmetics [A61K](#); food [A23L 1/035](#); biocides [A01N](#); petrol winning [E21B](#); hydrometallurgy, metal liquid-liquid extraction [C22B](#); mixers [B01F 3/00](#); polymers mixing; waxes [C08](#); paper [D21H](#); demulsification (anti foam) [B01D 19/04](#)]

## Definition statement

*This subclass/group covers:*

Emulsions, dispersions and suspensions if claimed per se

Compounding ingredients for forming emulsions, dispersions, suspensions

Different types of emulsions, dispersions (micro-, nanoemulsions, multiple emulsions, w/o emulsions)

## Relationship between large subject matter areas

Cosmetic preparations are classified in [A61K 8/00](#) and [A61Q](#)

Compositions for drilling of boreholes or wells are classified in [C09K 8/50](#)

Organic dyes are classified in [C09B](#)

Coating compositions are classified in [C09D](#)

Lubricants are classified in [C10M](#)

Detergent compositions are classified in [C11D](#)

## Informative references

Attention is drawn to the following places, which may be of interest for search:

Pesticides, disinfectants	<a href="#">A01N</a>
Food	A23
Cosmetic preparations	<a href="#">A61K 8/00</a> , <a href="#">A61Q</a>
Emulsion polymerisation	<a href="#">C08F 2/22</a>
Dyes, pigments	<a href="#">C09B</a>
Coatings, inks, paints	<a href="#">C09D</a>
Lubricants	<a href="#">C10M</a>
Detergents	<a href="#">C11D</a>

## Special rules of classification within this group

Only the compounds that form the emulsion are classified, ingredients that belong to another subgroup/subclass are classified there.

For example: organic dye dispersion, the dye is only classified in [C09B](#).

When main claims are general, for example a dispersed particle in a liquid, it's classified in [B01F 17/00](#).

In absence of an indication to the contrary, classification is made in the last appropriate place

Documents classified in the mixture groups are also classified in the individual group of [B01F 17/00](#)

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

Emulsifier	compound that promotes the dispersion of one liquid in another, as in the mixture of oil and water by lowering the surface tension between the two phases
Emulsion	disperse systems of two or more

	immiscible liquids, one forming the continuous phase and the other the dispersant phase
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## B01F 17/02

### Definition statement

*This subclass/group covers:*

Mercaptanes, thiophenes, sulfides, sulfites, their Se or Te analogues, elemental S, Se or Te

## B01F 17/04

### Definition statement

*This subclass/group covers:*

*This group covers :*

Sulfonic or sulphuric acids or salts thereof of hydrocarbons, their ethers and alcohols.

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Cosmetic or similar toilet preparations containing organic compounds with sulfur	<a href="#">A61K 8/46</a>
Detergents compositions based on sulfonic acids or sulfuric acid esters	<a href="#">C11D 1/12</a> , <a href="#">C11D 1/14</a> , <a href="#">C11D 1/29</a>

## B01F 17/08

**[N: heterocyclic S containing compounds]**

### Definition statement

*This subclass/group covers:*

e.g. thiazoles

## B01F 17/10

**[N: derivates of low molecular-weight sulfonic or sulfuric acids**

**Definition statement**

*This subclass/group covers:*

e.g. short chain (C1-C8-sulfonic acids)

**B01F 17/12**

**[N: aromatic sulfonic acids ]**

**Definition statement**

*This subclass/group covers:*

Aromatic sulfonic acids

**B01F 17/14**

**[N: Organic compounds containing phosphorous]**

**Definition statement**

*This subclass/group covers:*

e.g. phosphonic, phosphoric acids